HISTORY OF THE DEPARTMENT OF METALLURGICAL ENGINEERING

1870 - 1970

I. ORIGIN OF METALLURGY AT OHIO STATE UNIVERSITY

Metallurgy, as an area of study, has been an integral part of the curriculum at Ohio State since the inception of the university. When the doors of the Ohio Agricultural and Mechanical College opened for classes on September 17, 1873, Metallurgy was offered as an area of study under the Department of Geology, Mining, and Metallurgy. This department was one of the original seven which were in operation in 1873, and was headed by Edward Orton, Sr., President of the College, and Professor of Geology, Mining, and Metallurgy.

In June, 1877, the Department of Mines, Mine Engineering, and Metallurgy was formed and Henry Newton was appointed as Professor. Unfortunately, while on a geological visit to the Black Hills, he died of mountain fever before he could accept the position. William Guy of St. Louis, a graduate of the famed mining school of Freiburg, in Saxony, was offered the position, but was unable to come because of business connections in St. Louis.

John A. Church was then named Professor. He had worked at the Comstock Silver Mine for the U. S. Government and was a practical mining engineer and metallurgist. In June, 1879, having become quite unpopular in political and academic circles, Church was notified that his services were no longer needed and he resigned.

Nathaniel Wright Lord was placed in charge of the Department in 1879 [now called Mining Engineering and Metallurgy and in 1880 called Mining and Metallurgy] and was given only an Assistant Professorship because of the low number of students. In 1879 there were only five undergraduate students and the core curriculum consisted of two years of courses in Metallurgy, Mining, Theory of Veins, Mineralogy, Assaying, and Ore Dressing.

Professor Lord was one of the giants among the early engineering men at Ohio State. He came to Ohio State in 1877, and was made Director of the School of Mines in 1878. When the College of Engineering was reorganized in 1896, he was chosen to be the first Dean of the College. He relinquished his position as Dean in 1901 because of the pressures of other duties, but continued as Professor of Metallurgy and Mineralogy until his death. He was a mining engineer by education (graduated as Mining Engineer from Columbia University, 1876) and by most of his professional experience; but to a lesser degree, a chemical, metallurgical, sanitary, and agricultural engineer.

As a metallurgical engineer he studied the iron and steel industry in Ohio and rendered valuable service to the iron founders. He gave advice to the low-grade iron ore smelting industry in Ohio and paved the way to the production of high silicon alloys of iron, first produced in the United States and in Ohio by one of his pupils. His work led to improvement in handling phosphoric ores, development of phosphoric ores and development of phosphoric alloys of iron. While connected with the University and State Geological Survey his investigations led to improvements in the metallurgical industries in Ohio, and the country at large.

The study of metals increased in interest along with the mining industry in Ohio. During N. W. Lord's professorship in the Department of Mining and Metallurgy the student level, which was five undergraduates in 1878, increased considerably and in 1881 there were 22 freshman, 32 total undergraduates, and 80 students taking advanced courses in metallurgy and assaying. The degrees given during this period were designated Mining Engineer or Engineer of Mines (M.E.or E.M.)

Thus metallurgy at Ohio State had its real beginning under the Department of Mining and Metallurgy headed by N. W. Lord.

II. DEVELOPMENT AND EXPANSION

Separation from Mining and Mineralogy

In 1896, the Department of Mining and Metallurgy was changed to the Department of Metallurgy and Mineralogy under N. W. Lord and he remained head of this department until his death on May 23, 1911. His contributions to the university were honored by a memorial service and dedication of a new engineering building, Lord Hall in June, 1912.

Professor Edward Elsworth Somermeir was then placed in charge of the department. Somermeir continued to be in charge of the Department of Metallurgy and Mineralogy from 1911-1913, and was part-time Professor from 1913-1919. In 1913, Dana J. Demorest, who had been an Assistant Professor since 1908, was given the title of Professor, and in view of Somermeir's failing health was carrying on the major tasks of administration.

A major change in the curriculum also occured in 1913 when Metallurgy and Mineralogy became two separate departments. Dana J. Demorest became acting head of the Department of Metallurgy and W. J. McCaughey was appointed Assistant Professor to head the Department of Mineralogy.

D. J. Demorest

Professor Demorest had graduated from O.S.U. in 1907 with a Bachelors degree in Chemical Engineering. He worked for a year with the U.S. Bureau of Mines as a chemist, and in 1908 as a chemist for the Union Pacific Railroad. He accepted an appointment as Assistant Professor in the Department of Metallurgy and Mineralogy in 1908 under N. W. Lord.

After years of planning, the Engineering Experiment Station was formally organized in the academic year 1915-1916, and Professor Demorest was selected as a member of the seven-man advisory council.

Professor Demorest and one of the instructors in Metallurgy, E. C. Smith, were given a leave of absence for the duration of W.W.I to fulfill a critical need by the armed forces for war-related work in metallurgy and chemistry. Professor Demorest was assigned as Commanding Officer, U. S. Army Toxic Gas Plant at Edgewood Arsenal. He returned to the department in 1919, but E. C. Smith remained on leave of absence.

In March, 1919, after years of illness, Professor E. E. Somermeir died of tuberculosis at age 45. He had been a close friend of N. W. Lord, who had become fond of him as a student, and although he had graduated from Pharmacy in 1898, he was appointed as Assistant in Metallurgy as a metallurgical chemist in 1899. He went on to become Professor of Metallurgy and Mineralogy, and headed that department after the death of N. W. Lord. Shortly afterwards his health forced him to give up the chair to D. J. Demorest.

William A. Mueller was appointed Special Instructor in Metallurgy in 1920, and in 1921 was promoted to Assistant Professor. Mueller had graduated from O.S.U. in 1911 as an Engineer of Mines. He had a variety of Industrial experience as a chemist and metallurgist. He was a millman and chemist for Detroit Copper Mining Company and U. S. Bureau of Mines, 1912; Assayer and Chief Chemist, American Platinum Works, Newark, New Jersey and Ricketts and Banks, New York City in 1913; Assistant Metallurgist for Inspiration Consolidated Copper Company in Arizona, 1914; Captain, Chemical Warfare Service, U.S. Army in 1918; and Mining and Consulting Engineer for the Southern Gypsum Company, North Holston, Virginia, 1919-20.

In spite of the separation of the Department of Metallurgy and Mineralogy, the degrees granted in the Department of Metallurgy up to 1915-16 were called Engineer of Mines, but in that academic year two degrees were given: Bachelor of Engineering in Mines and Engineer of Mines.

The year 1921 was the first time that a degree, Bachelor of Metallurgical Engineering (B. Met. E.), was awarded and there were five recipients. There was one

graduate student in metallurgy at this time. Although many students had taken advanced studies in metallurgy, the records do not indicate any masters degrees in metallurgy before 1921. The undergraduate enrollment varied during the years. In 1921, thirty undergraduate students were enrolled in the first semester, and forty-one during the second.

James O. Lord joined the staff as an instructor in September, 1921. He had graduated from Ohio State in 1915 with the degree of Bachelor of Chemical Engineering. He became strongly interested in metallurgy through his father's (N. W. Lord) interest and his environment. After graduation he joined the staff of the U. S. Steel Corporation at Gary, Indiana, where he had practical experience with open hearth furnace operations. He enlisted in the Chemical Warfare Branch of the Army in 1917 and was stationed at Niagara Falls with the Oldbury Electrochemical Company where the toxic gas phosgene was being developed. In December, 1918, he received an honorable discharge as a Second Lieutenant and returned to his former position at U.S. Steel. He became interested in metallographic techniques for iron and steel identifications, then in its infancy. His efforts in this field and his expert handling of photomicrography led to his recognition as one of the outstanding men in this area. This led to his appointment as Instructor of Metallurgy at Ohio State. With the addition of Lord, the Metallurgy staff had three members (Demorest, Mueller, Lord) who were to run the Department of Metallurgy for over 20 years.

During the period 1913-1948, the Department of Metallurgy was closely associated with the iron, steel, and fuel industries in Ohio and the research efforts of the department were focused at solution to various industrial, as well as theoretical problems. Demorest, the Chairman, was an expert in chemical analysis of fuels and metallurgical analysis. Mueller was interested in iron, steel, and fuels, as well as non-ferrous metallurgy. J. O. Lord was a licensed chemical and metallurgical engineer and conducted research in the metallography of iron, steel, and alloy systems.

When the Engineering Experiment Station building was completed in 1925, Metallurgical Engineering was allocated a major portion of the first, second, and third floors for laboratory experimentation with coal, gas, and metals.

By the late 1920's research in fuels was being emphasized by the department to satisfy needs of Ohio and nationwide industries. Seniors could elect a course area which was essentially a minor in fuels, and would lead to employment in the gas and fuel engineering fields. At this time, Ohio State was the only university in the country with a full-scale gas retort and coal-cleaning apparatus. Fellowships were available in fuel research. Research conducted during this period was in the areas of malleable castings, case-hardening via nitrogen, laws of metallic diffusion, and carbonization of coals.

Professors Demorest and Mueller were both quite interested in fuel research. Demorest authored several extensive bulletins on "Carbonization of Ohio Coals", "Gasification of Ohio Coals", and "Transfer of Natural Gas to Manufactured Gas". He had also co-authored a book entitled "Metallurgical Analysis" with N. W. Lord.

In 1936, Laurie Rautio was appointed as Instructur in the department. He had graduated from Ohio State with a Bachelor's degree in Metallurgical Engineering in 1931. He worked at the American Rolling Mills Company, Ashland, Kentucky (1931-36), as a Metallurgical Assistant and as an open hearth metallurgist. He was an instructor in metallurgy from 1936-1943, when he was elevated to the rank of Assistant Professor. He taught courses in physical metallurgy concerned with mechanical testing, metal working, and assisted in metallography. He was given leave of absence for war-related work in 1944 and afterwards went into industrial work.

The undergraduate level fluctuated during the period 1921-1948 and generally ranged from 30-40 students, while the number of degrees granted yearly gradually increased

from 5 in 1921 to a peak of 22 degrees (B. Met. E) granted in 1938. Although the graduate enrollment was low during this period (compared with today's enrollment) many metallurgy students, as well as those from other departments, pursued advance training in metallurgy.

The growth of metallurgy as a science was becoming increasingly important and critical as the study of the microstructure and properties of metals expanded in the twentieth century. World War I had indicated the drastic shortage of materials scientists and had pointed the way to a widely growing need and use for materials engineers.

The recent and more definitive study of metallurgy was encouraged by the industrial and technological demands of World War II. Research efforts in metallurgy, which had been closely allied with industry in Ohio, began to shift emphasis towards the needs of the war effort. Thus began the recent and continuing research efforts supported by both industry and federal research organizations.

M. G. Fontana

In November, 1945, Dr. Mars G. Fontana was appointed Professor of Metallurgical Research at the Engineering Experiment Station and part-time Professor of Metallurgical Engineering in the Department of Metallurgy. This appointment marked the beginning of a burgeoning and progressive period of development of Metallurgical Engineering at Ohio State. In 1946 he became a full-time Professor in the department, and in 1948 he succeeded Professor Demorest as Chairman.

Dr. Fontana had received his Bachelor's degree in Chemical Engineering (1931), his Master of Science degree in Metallurgical Engineering (1932), and his Doctor of Philosophy degree in Metallurgical Engineering (1935); all from the University of Michigan. He worked as Research Assistant, Department of Engineering Research, University of Michigan from September, 1929 to October, 1934. He then worked as a Metallurgical Engineer and Group Supervisor, Technical Division, Engineering Department, E. I. duPont de Nemours and Company, Inc.,

at Wilmington, Delaware from October 8, 1934 to October 31, 1945. His work at Dupont concerned the materials of construction in various production departments, and development of materials and designs for acid service. He had four patents assigned to Dupont in connection with his corrosion work.

Under the chairmanship of Dr. Fontana the Department of Metallurgical Engineering[1] experienced rapid change and development. By working energetically to build up the programs of instruction and research in the department, he led the department into the forefront of metallurgy in this country.

The research program before 1946, as previously mentioned, was closely aligned with industry and problems in the iron, steel, and fuel areas. In 1946, the first contract research project of substantial magnitude was granted to Dr. Fontana by the Office of Naval Research [then called Office of Research and Inventions]. The $23,000 research effort was initiated to investigate the fundamentals of corrosion. This was only the beginning of a continual expansion of research efforts in metallurgy. Today research under contract with industrial and government agencies totals over $1,000,000 per year.

This contracted sponsored research has increased the capacity for training graduate students, and improved the quality of their advanced education by providing practical research problems and more and better equipment. In the past a student doing his thesis research had to spend valuable time building his own equipment from scratch, but increased research grants made possible the purchase and use of expensive and sophisticated scientific equipment and instrumentation for the laboratories. Following such training programs the students are more immediately useful to industry and government research laboratories.

Dr. Fontana has been able to attract and retain

1. The College of Engineering changed the name of the department on January 1, 1955 from Department of Metallurgy to Department of Metallurgical Engineering.

staff members of unusually high quality. Before he joined the department in 1946, there were only (3) full time staff members: Professors Demorest, Mueller, and Lord.[2] Dana J. Demorest was Chairman of the department until replaced by Fontana in 1948. Demorest retired in 1952. William A. Mueller retired in 1956, and died in 1969. James O. Lord died of a heart attack on October 13, 1958. These men did a fine job with undergraduates but were too understaffed to develop a large graduate program.

Since 1946, the staff has more than tripled in size and presently has (13) full time professors and (1) part time professor. In addition, Battelle Memorial Institute sponsors a $25,000 Visiting Professorship each year. This chair is held by a prominent scientist or engineer from a university or industry either in the United States or a foreign country. The Battelle Professor presents a formal course in his area of specialization and provides informal consultation to graduate students on their research projects. This affiliation allows the student to broaden his understanding of areas beyond his immediate field of specialization.

In 1968, through the efforts of Professor Joseph W. Spretnak and the generosity of David E. Tilton of the Columbus Forge and Iron Company, the nation's first Professorship in Mechanical Metallurgy was established at Ohio State. In honor of his father, David made a $50,000 contribution to be used over a ten-year period, establishing the Earl M. Tilton[3] Professorship in Mechanical Metallurgy. A matching grant is provided by the Forging Industry Educational and Research Foundation over the same period. Dr. Spretnak was chosen as the professor to receive this honor and it has greatly aided his efforts in the area of mechanical metallurgy.

2. More complete profiles on these men are in the Appendix.
3. Earl M. Tilton, O.S.U. graduate in Ceramic Engineering, 1913.

The faculty members (excluding Demorest, Mueller, and Lord mentioned previously) since 1946 are shown below in the chronological order of their appointment.

Name	Date	Ph.D. Institution
Fontana, Mars G.	11-1-45	University of Michigan
Spretnak, Joseph W.	11-2-48	University of Pittsburgh
Speiser, Rudolph	12-16-48	Brooklyn Polytechnical Institute
Beck, Franklin H.	4-1-49	Ohio State University
Williams, Douglas C.	8-2-55	Cornell University
St. Pierre, George R.	10-1-56	Massachusetts Institute of Technology
Powell, Gordon W.	10-1-58	Massachusetts Institute of Technology
Moazed, Khosrow L.	10-1-59[4]	Carnegie Institute of Technology
Hirth, John P.	10-5-61	Carnegie Institute of Technology
Rapp, Robert A.	10-8-63	Carnegie Institute of Technology
Staehle, Roger W.	3-3-66	Ohio State University
Rigney, David A.	12-1-67	Cornell University
Boorstein, William M.	9-1-67	University of Michigan
Meyrick, Glyn	9-1-67	University of Bristol (England)
Parsons, James A.	10-1-67	Wilberforce University (Honorary Doctors Degree)

Battelle Visiting Professors:

Name	Year	Professional Affilliation
Hopkins, B. E.	1962-63	National Physical Laboratory Teddington, England
Raynor, G. R.	1963-64	University of Birmingham England
Novotny, H.	1963-64	University of Vienna

4. Resigned in 1968 to accept a Professorship at North Carolina State University.

Name	Year	Professional Affilliation
Dan McLachlan	1964-65	Denver Research Institute
W. C. Leslie	1965-66	Bain Laboratory, United States Steel Corporation
R. Schuhmann	1966-67	Purdue University
S. Kobayashi	1967-68	University of California, Berkley
C. Laird	1968-69	Ford Scientific Laboratory, Detroit
Turner Alfrey, Jr.	1969-70 Autumn	Dow Chemical Company
Stephen W. Tsai	1969-70 Winter	Chief Scientist Air Force Materials Laboratory
Lenel, Fritz V.	1969-70 Spring	Chairman, Materials Division, Rensselaer Polytechnic Institute

Professor Fontana has worked hard to maintain a staff of the highest quality with a spectrum of experience which includes the important scientific and engineering areas of metallurgy, and which represents a variety of industrial and academic backgrounds. He has succeeded in creating one of the most competent and widely-respected metallurgy staffs in the nation.

In 1948, Dr. J. Spretnak received the Howe Medal of the American Society of Metals (ASM), given annually for the best paper in "ASM Transactions". Four members of the faculty (Spretnak, St. Pierre, Hirth, and Rapp) have received the Bradley Stoughton Award given annually by the ASM to the best teacher in Metallurgy under 35. Dr. John P. Hirth also received the Hardy Gold Medal of AIME given annually to the most promising young metallurgist under 30 and the Curtis McGraw Research Award of the ASEE in 1964. Professor Roger W. Staehle, at age 34, was chosen in 1969 as Plenary Lecturer for the International Conference on Metallic Corrosion. Previous Plenary Lecturers had been at least 50 years old. These are only a few of the major awards bestowed upon this faculty. Their contributions to education, research, and literature in the field of metallurgy are an outstanding tribute to this university

and to the leadership of Dr. Fontana.

Recognizing that the most significant contribution of any faculty is the quality of its teaching and training of students. Dr. Fontana began immediately to develop and expand the graduate program. Before 1946 only 27 Master of Science degrees and 6 Doctor of Philosophy degrees were granted in Metallurgical Engineering. During the period of 1946-1950 there were 33 students who completed M.S. requirements and 11 students graduated from the Ph.D. program. In the last 20 years as the volume of sponsored research, the size of the staff, and the laboratory facilities all were expanded it became possible to build a sizable graduate program in metallurgy. During the period 1948-1969 there have been 198 Masters degrees and 89 Doctoral degrees granted in Metallurgical Engineering.[5] These figures illustrate the tremendous growth of the graduate program in the past twenty years. This program has continually grown to the point where there are now approximately 68 full-time and 35 part-time graduate students. In recent years the department has been second only to Massachusetts Institute of Technology in the number of Ph.D. degrees per year.

Undergraduate enrollment in Metallurgy has increased during Fontana's chairmanship. Prior to 1946, the undergraduate level generally ranged from 30-40 students and averaged 9-11 graduates per year. In the late 1930's and early 1940's the levels were above this average and approximately 50 students were enrolled per year with an average of 19 graduates per year. The highest number of undergraduates receiving degrees occurred in 1949 and 24 B. Met. E. degrees granted. Since then the undergraduate student level in Metallurgical Engineering (Professional Division) has averaged 46 students.

5. A table of the number of graduate degrees in Metallurgical Engineering by year in included in the Appendix.

this generally produces 10-15 Bachelor candidates per year.[6] In 1968, an OSU-industry scholarship program was initiated and a significant increase in freshman enrollment resulted. Since the first degrees were granted in 1921, there have been a total of 541 Bachelor's degrees granted in the Metallurgical Engineering (figures projected through Summer Qtr., 1969).

The growth and development in the areas of research, staff members, and graduate enrollment obviously made it necessary for a corresponding expansion of classroom, laboratory, and office space. Prior to 1959 the Department of Metallurgy was housed in Lord Hall and occupied approximately 15-20 rooms of this building which had been completed in 1912. Later some additional area acquired in the Engineering Experiment Station which was completed in 1925.

The department maintained a sizable portion of the E.E.S. building for many years and a major part of its research was done in the laboratories there. When Dr. Fontana joined the metallurgy staff in 1945, the department maintained several labs and limited office space in the Engineering Experiment Station Building on the second floor and in the basement. The laboratories on the second floor were used for research in mechanical testing, corrosion, and metallography. Here Dr. Beck conducted a large corrosion research program. In the basement area the department's electric arc furnace was housed and Professors Spretnak and Fontana conducted cryogenic research efforts in this area. Dr. Williams also conducted foundry research in the basement labs and maintained his sand equipment there.

In 1959, the main department office was moved to the newly completed Chemical Engineering Building on West 19th Avenue. The metallography labs were also moved to the first and second floor of this building. Future plans were being made for the construction of a Metallurgical Engineering Building, but for the next few years the department continued to use what limited space was available.

6. A table of the number of B. Met. E. degrees by year is included in the Appendix.

The Metallurgical Engineering Building was completed in 1963 and the department occupied 75% of the floor area, while some of the remaining area was allocated to Mineralogy. At this time some of the laboratory equipment from Lord Hall was moved into the facilities. The Metallurgical Engineering Building was actually a continuous extension from the original structure of the Chemical Engineering Building. Before the Metallurgical Engineering Building was even completed it became evident that the laboratory, classroom, and office needs of the department had exceeded the allocated area of the new building.

It was not until 1968, upon the completion of MacQuigg Laboratory that the department laboratory space needs were adequately met. The laboratory area of this building were specifically designed by Dr. Fontana, Dr. Staehle and other staff members to meet the needs of our teaching and research programs. MacQuigg Laboratory marked the completion of what is essentially a Materials Science Complex of building, all inter-connected via hallways and floors of the original structures. The complex includes the Chemical Engineering Building, Metallurgical Engineering Building, MacQuigg Laboratory, and Watts Hall, housing the Departments of Chemical Engineering, Metallurgical Engineering, Ceramic Engineering, and Mineralogy. With the completion of this complex in 1968, the Department of Metallurgical Engineering was allocated over 50,000 square feet of laboratory and office space. This allowed the department to move out of Lord Hall completely. It presently occupies 80% of the Metallurgy Building, and 50% of the area of MacQuigg lab and Watts Hall combined.

Twenty-three of the many laboratories in the complex were designed for a Corrosion Center. The Center is a formalization of the substantial efforts in corrosion research by Beck, Staehle and Fontana. The program of the Center includes an extensive corrosion research effort, an information center, an expanded academic program and a regular program for practicing engineers. The purpose of the program is to bring the science of corrosion closer to engineering.

The period of the chairmanship of Mars G. Fontana has indeed been the most productive era of growth and development in the Metallurgical Engineering at Ohio State. This era

has been marked by a dynamic challenge and development of modern scientific metallurgical engineering. The faculty of the department has met this challenge through an integrated expansion of faculty, facilities and requisite research and graduate programs to support the technical advances in the field of Materials Science.

III PRESENT ORGANIZATION

Personnel

Faculty	Chairman	Dr. Mars G. Fontana
	Professors	Dr. Franklin H. Beck
		Dr. John P. Hirth
		Dr. Gordon W. Powell
		Dr. Robert A. Rapp
		Dr. George R. St. Pierre
		Dr. Rudolph Speiser
		Dr. Joseph W. Spretnak
		Dr. Douglas C. Williams
	Associate Professors	Dr. Glyn Meyrick
		Dr. Roger W. Staehle
	Assistant Professors	Dr. William M. Boorstein
		Dr. David A. Rigney
	Adjunct Professor	Dr. James A. Parsons
	Visiting Battelle Professors	Dr. Turner Alfren, Jr. Autumn Quarter 1969
		Dr. Stephen W. Tsai Winter Quarter 1970
		Dr. F. V. Lenel Spring Quarter 1970

Postdoctoral Fellows	Dr. K. N. Goswami India
	Dr. D. V. Subrahmanyam India
	Dr. K. G. Sheth India
	Dr. M. N. Shetty India
	Dr. S. Wagner Austria
	Dr. G. Pilkington Great Britian
	Dr. M. Rockel Germany
	Dr. C. M. Chen China (Wright Patterson AFB)
	Dr. D. A. Shores

Research Associates	Japnell D. Braun
	Robert L. Cowan
	Sureshchandra Ghorpade
	George E. Kerns
	Salah E. Mahmoud
	Samuel A. Martin
	Tomomi Murata
	Edwin L. Owen
	John L. Ratliff
	Kazumitsu Shinohara
	George J. Theus
	Ming T. Wang
	Craig Landefeld (NDEA)

Research Associates (con't)	Donald W. Stevens (NDEA)
	David W. Short (NASA)
	Joe H. Payer
	Clarence W. Weidner, Jr. (NSF)
	R. Daniel McCright (NSF)
	Roger C. May (Kennicot)
	Richard A. Perkins (Inco)
	Edward N. C. Dalder
	Robert J. Hart
	Timothy K. Leonard
	John F. Gloz
	Allan P. Katz
	Francisco O. Du
	Donato N. Firrao
Research Assistants	R. Clark Amos
	Ralph H. Berglund
	Jeffrey Blough
	Hung-Erh Chaung
	Joseph Dryer
	David Langstaff
	Indra J. Loomba
	Hugh A. Luckey
	T. A. Ramanarayanan
	Donald J. Shade
	Jared P. Sherry
	Jerry D. Thomas
	Joseph M. Vanecko
	Ronald Hughes
Technicians	Adelbert Bartholf
	Roland V. Farrar
	Peter Whibley
	Steve Trumbo
	John Frey
Machine Shop	Neal E. Farrar
	Ross E. Justus
	Paul R. Lewis
Administration and Office Personnel	Mrs. Helen K. Erdman
	Mrs. Louise Flanagan
	Miss Lindsay A. Hauser
	Miss Joanna Kramer
	Miss Wilma Pestel
	Miss Dianna Steele
	Mr. Richard E. Plymale
	Mr. John E. Stone

The Department of Metallurgical Engineering would also like to make special recognition of a few office and technical staff members whose outstanding service over the years is noteworthy.

Mr. Neal Farrar, Chief Machinist and head of the department's machine shop, has been in the department since October, 1949. He was previously with Curtiss-Wright Aircraft Company as a foreman for tool and die operations. His assistance in the construction of precision experimental equipment over the past 20 years has been a significant contribution to research and experimental efforts in metallurgy.

Mrs. Helen K. Erdman, Secretary for Dr. Fontana, has been with the Metallurgical Engineering Department since April, 1952. Through the years her professional competence and wealth of knowledge about the administrative office functions of the University have been invaluable to the functioning of the department.

Mr. Adelbert Bartholf, Technical Assistant, has been with the department since June, 1959. He had previously been working under Dr. Otis Everhart of Ceramic Engineering, 1955-59. His work in the areas of mechanical testing, corrosion, and low-temperature mechanical properties under Dr. F. H. Beck has been of the highest quality.

Physical Facilities

Presently the Department of Metallurgical Engineering has over 60 laboratories in the Materials Science complex at Ohio State. These laboratories are housed in the Metallurgical Engineering Building and in MacQuigg Laboratory and they occupy over 50,000 sq. ft. of area. This space and the facilities, listed below, make it possible to accommodate at least 95 graduate students on a full-time basis.

The Departmental laboratories are furnished with the following special equipment for teaching and research: electron microprobe, four electron microscopes, mass spectrometer, torsion tester, micromanipulator, X-ray diffraction, gas chromatography, Balphot metallograph, hot stage metallograph, three unitron metallographs, field ion micrscope, field emission microscopes, two Instron precision tensile machines, electron beam zone refiner, horizontal zone refiner, large magnet, TV for metallography, X-ray microscope, anitrol potentiostats, internal friction apparatus, Zeiss interferometer, Sartarious semi-microbalance, vacuum evaporator, vacuum melting chamber, Syntron, vacuum leak detector, scanning electron microscope, wire drawing equipment, and swaging equipment.

The Department is served by the Materials Science Library, a division of the University Libraries. This library has 12,000 volumes related to metallurgical engineering and receives over 200 journals and technical magazines. Immediately adjacent are the Physics and Chemistry Libraries with 26,000 and 30,000 holdings respectively.

The Departmental faculty offices are located on the first floor of the Metallurgical Engineering Building and the fourth floor of Watts Hall.

A well equipped Machine Shop is located in the basement of the Metallurgical Engineering Building. Neal Farrar, Chief Machinist, heads a staff of three machinists which builds precision experimental equipment for the students and faculty.

IV. APPENDIX

SHORT BIOGRAPHY OF DEPARTMENT CHAIRMEN

DANA JAMES DEMOREST
(A Memorial Biography)

Professor Dana James Demorest, Professor Emeritus in the Department of Metallurgical Engineering at The Ohio State University, died on June 30, 1958, of a heart condition of about a year's duration. He was seventy-five years of age.

Thus was terminated a career of active and faithful service that extended over a period of more than fifty years.

He was born at Marysville, Ohio, August 6, 1882. His father was a teacher and later became Superintendent of Schools at Marysville. Both parents were of American lineage. His father's family was of French origin and his mother was Scotch-Irish. He had three brothers and a sister. One brother, Don L. Demorest survives him and is a professor in the Department of Romance Languages at this university. His sister, Mrs. William Larrimer, is living in Columbus. A married daughter, Mrs. Joseph Scheinin, lives in New York City.

Dana Demorest attended The Ohio State University as a student. He evidently made an exceptionally good record, for while he was still in school, he was very highly recommended for a job with the Union Pacific Railroad Company at Omaha, Nebraska. This job he took, as sustaining employment,before he graduated. He returned to Ohio State in 1906, obtaining part-time employment as a student assistant in the Department of "Metallurgy and Mineralogy" under Professor N. W. Lord. He displayed unusual proficiency in inorganic and analytical chemistry, and the skill he developed in this work served him throughout his life.

He graduated with the degree of Bachelor of Chemical Engineering in 1907, at which time also he was married. During this period he spent a few months as an employee of the Illinois Steel Company of Gary, Indiana, but again returned to the University to teach. In 1908, his title was "Acting Assistant Professor". In 1909, he became Assistant Professor.

In 1913, he was made Professor of Metallurgy, which title he held until his retirement in 1952. Professor E.E. Somermeier

had been in charge of the Department of Metallurgy after the death of Professor Lord in 1911, and Mineralogy had been made a separate department under Professor William J. McCaughey. Professor Somermeier was in poor health and, in 1914, Professor Demorest took over the Departmental duties as Acting Head.

Practical Chemical Analysis had long been one of the functions of the Department of Metallurgy, where a special laboratory was maintained for that purpose. Professor Demorest and Professor Somermeier had operated it together after the death of Professor Lord. Here a large amount of work was conducted for the University and various other institutions such as the State Board of Agriculture, the State Board of Health, the Penitentiary, Institutions for the Insane and Feeble Minded, The State Geological Survey and the Columbus School Board. In 1916, Professor Demorest was given the additional title of University Chemist. In 1917, he was made Head of the Department of Metallurgy.

On January 8, 1918, he was granted a leave of absence in order that he might serve the United States Government in connection with the war effort. He was called to this service by Dr. William McPherson who was, at that time, a Captain in the Ordnance Department, Trench Warfare Division. The assignment was the development and production of toxic gases for use in trench warfare.

The most effective gas then known appeared to be phosgene. Little was known of this gas at the time except that it was extremely poisonous. Dr. Francis C. Frary, a chemist from the Oldbury Chemical Company at Niagara Falls, had had some experience with it, so he and Professor Demorest set out to plan and construct a plant at Edgewood, Maryland, for its production.

Here Dana Demorest displayed his true ability as an engineer, and his personal courage and loyalty to his country's cause. Due largely to his effort and enthusiasm, within six months phosgene was being produced at Edgewood, and a pilot plant at Niagara Falls, at a rate that must surely have discouraged the enemy.

Shortly after undertaking this work, Professor Demorest was urged to accept a commission in the National Army

which he did with a greatly reduced rate of pay. The commission was that of First Lieutenant, a rather absurd situation considering the responsibilities and authority that he commanded. He had officers of rank up to that of Major working under him. His concern for Army protocol was apparently not great at that time, for, in order to expedite the building of the plant, it became necessary to obtain authority for quick action. To this end, with the help of Colonel William H. Walker, who was Commanding Office of the Edgewood Arsenal, he obtained an interview with Newton D. Baker, then Secretary of War, and was granted the authority he needed. This was quite a feat for a First Lieutenant and excited the admiration of his associates.

He was later given supervision of the chloropicrin (tear gas) production and also charge of the mustard gas plant and his rank was increased to that of Major.

The mustard gas was particularly hazardous, and many of the men who worked with it received bad burns. He himself received burns about his nose and eyes from which he was several years recovering. It was said that he would not permit any work to be done where a spill or other dangerous situation occurred unless he himself was present.

While it is doubtful if much of the toxic product of this operation was used in actual warfare, the knowledge of the extent of, and capacity for its production must have had an important bearing upon bringing the war to a close. Germany, already on her knees in the summer of 1918, must have realized that any attempt to withstand the terrible assult of an all-out production, by the United States of America, of steel, explosives, and toxic gas was utterly hopeless. To quote from a report by Major Demorst, "by early spring or February of 1919, we would have been ready for 70 tons of phosgene, 25 tons of chloropicrin, and 70 tons of mustard (per day). Thank God it was not necessary."

In recognition of this superb effort and accomplishment the friends who had worked with Major Demorest at Edgewood, including superior officers and subordinates, under the leadership of Colonel Edward Orton, Jr., sought to have conferred upon him the Distinguished Service Medal. Testimonial

and supporting letters were sent by many members of the organization to Brigadier General Amos Fries, Chief of the Chemical Warfare Service, who himself strongly supported the project. To read the letters is to develop a feeling of pride and gratitude for having known Major Demorest. All of them stressed his ability, his tireless devotion to duty, his personal courage, and his kindly consideration for those about him and under his command.

In a non-explanatory letter from the Adjutant General the award was denied. However, the letters were collected and placed in an illuminating binding which was presented to him by Colonel Orton at an appreciation breakfast held at the Ohio Union Building in June, 1923. His daughter has requested that the book containing the letters be turned over to the Ohio State Archaeological Museum.

Returning from the Service, he was reinstated as Professor of Metallurgy at the University. In 1918, Professor Somermeier died and Professor Demorest retained his position as Head of the Department until 1948 when he resigned the Chairmanship.

Among his technical contributions was his revision and enlargement of the book, "Metallurgical Analysis." This book was originally written by Professor N.W. Lord under the title, "Notes on Metallurgical Analysis." Professor Demorest's first revision was published in 1916. It included several added chapters dealing with gas and fuel analysis, and it brought up to date the original text on the analysis of metals and minerals. He made a second revision in 1924. For many years this book was a standard text in many colleges and was used as a guide to analytical procedure in metallurgical and ceramic plants throughout the United States.

He was a member of the American Society for Steel Treating (later the American Society for Metals) from its beginning in 1920, and was honored by being presented with the first life membership in that organization. He made a number of contributions to its technical programs.

He was a member and active in the American Chemical Society and, since 1921, held the post as Section Editor for Chemical Abstracts in charge of the Metallurgy and Metallography Section.

He was active in the American Gas Association and supervised an extensive research program for the United Gas Improvement Company, a member organization, during the middle 1920's.

He held memberships in the American Institute of Mining and Metallurgical Engineers, The American Electrochemical Society, and The American Society for Testing Materials. He also was a member of Sigma Xi.

During the late 1920's, he became interested in mining property in Utah. He organized and, until the time of his death, was president of the Utah Alloys Corporation. The original product of their activities was vanadium but, later, with the advent of atomic energy, they turned their attention to uranium and successfully produced it.

Having been reared in a religious family, Professor Demorest always maintained a deep religious faith. A tragic event that affected his entire outlook on life was the death of his young wife, Margaret, following the birth of their daughter shortly after he started his teaching career. It was a crushing blow and in his sorrow, he turned to his church. He never married again and, until his death, was very active in the Indianola Methodist Church of which he was one of the founders. He was a member of its Official Board and was ordained as a lay preacher.

Outstanding among his charitable activities was the Godman Guild which he helped to found about 1917. He was its Vice President for many years, and in 1951 was made its President. He, at one time, took an active part in the Community Fund work. He was an active Mason and one time Master of Kinsman Lodge.

But his true charity was expressed in his personal care and concern for those about him. Probably all of us have friends and acquaintances who are in trouble, indigent, unlucky, or unsuccessful. We have encountered students whose careers were contingent upon financial help. Dana Demorest was a friend in need to many such. He gave of his time and his substance, and yet in such a way as not to embarrass them or unduly oblige them. He always looked at the good side of their character and sought to develop it.

The alumni of the Department of Metallurgy have held him in high esteem and reverence, many returning periodically to seek his advice and counsel which were always given with kindly concern and interest. Some years ago a scholarship was established in the Department by the action of the Metallurgical Alumni. It is named the Dana J. Demorest Scholarship Fund and has grown, through donation, to such proportions that it is an important aid to promising students in Metallurgy.

Professor Demorest's life is an example of consecreation to duty and service toward his fellow men. It is with sorrow mixed with admiration and pride in his friendship that we record his passing.

MARS G. FONTANA

1. Born in Iron Mountain, Michigan on April 6, 1910.

2. Received Bachelor's degree in chemical engineering (1931); Master of Science degree in metallurgical engineering (1932); and Doctor of Philosophy degree in metallurgical engineering (January, 1935); all from the University of Michigan at Ann Arbor. Research Assistant, Department of Engineering Research, University of Michigan, September 1929 to October 1934. Work included investigations of scaling of steel at forging temperatures, development and use of apparatus for vacuum fusion analysis for gases in steels, high temperature creep of metals and alloys, and basic work on the thermodynamics of steelmaking. Published four articles based on this work.

3. October 8, 1934, to October 31, 1945. Metallurgical Engineer and Group Supervisor, Technical Division, Engineering Department, E. I. duPont de Nemours and Company, Inc., Wilmington, Delaware. Organized work on materials of construction in various DuPont production departments. Developed materials and designs for acid service. Four patents assigned to DuPont in connection with his corrosion work.

4. November 1, 1945 to date. Professor and Chairman (1948), Department of Metallurgical Engineering; Director, Corrosion Center; Supervisor of Metallurgical Research, Research Foundation, The Ohio State University. A review of his most significant responsibilities and accomplishments during this period is given in the sections of this resume which follow.

Dr. Fontana is married and has four children: Martha (married to metallurgist at Republic Steel Corporation), Mary Beth (graduated Summa cum Laude from Ohio State University Medical School in 1966), David (presently serving in the U.S. Air Force), and Tom (a junior at Ohio State University).

Professor Fontana is active in his community. He participates or has participated in cub scouts, cub scout baseball (he has played semi-professional baseball), boy scout fund raising, First Congregational Church as usher and member of the building committee, and United Appeals.

ENGINEERING ACCOMPLISHMENTS

Contributions to the Literature

Dr. Fontana's contributions to the literature have been characterized by "spreading the gospel" of the importance of corrosion engineering, presenting scientific findings in digestible form to the practicing engineer, and working on the frontier of engineering research in the corrosion field. Significant aspects of his publishing activities are described below.

1. Articles in Technical Journals

He has published over 150 technical articles, which are noteworthy not only singularly for their content but also collectively for their range of subjects within his field. These works include studies of anodic dissolution, pitting, passivity, oxidation, stress corrosion, intergranular corrosion, and erosion-corrosion. A list of selected articles are appended to this resumé. Following are some of the firsts announced in various of his papers:

a. First to establish the basic mechanism for "catastrophic oxidation" of stainless steels and alloys in the presence of molybdenum and vanadium. This was previously an unexplained failure of engineering materials.

b. First to study and establish the mechanism for "knife-line attack" of stabilized stainless steels. Knife-line attack is an intergranular failure of "immune" Type 347 stainless steel in fuming nitric acid.

c. First to elucidate conjoint action of stress and electro-chemical action for propagation of stress corrosion cracks--shown visually in a movie film.

d. First quantitative measurements of stresses produced by corrosion products during propagation of chemical cracking.

e. First to elucidate cracking of 18-8 stainless steel in low chloride environments under very low stresses.

2. Books

Corrosion: A Compilation, Hollenback Press, 1957.

Corrosion Engineering (with N. D. Greene), McGraw-Hill, 1967.

Stress Corrosion Cracking of Steels (with R. W. Staehle), to be published jointly for the American Society for Metals and the Atomic Energy Commission in 1969.

Advances in Corrosion Science and Technology, see No. 6 below.

3. Corrosion Magazine

Since 1962 has been Editor of Corrosion magazine published by the National Association of Corrosion Engineers.

4. Column in Industrial and Engineering Chemistry

His column on corrosion appeared monthly in Industrial and Engineering Chemistry from 1947 to 1956. Based on this column he published a book: Corrosion: A Compilation in 1957, see No. 2 above.

5. American Society for Metals - MEI Course on Corrosion

At the request of the American Society for Metals he wrote a complete course in corrosion for use in the in-plant training of engineers and technicians. The course is in the form of a notebook containing 15 chapters and 276 (8-1/2x11) pages.

6. Advances in Corrosion Science and Technology

He is Co-Editor (with R. W. Staehle) of a series, Advances in Corrosion Science and Technology, published by Plenum Press. This series is being started to fill a gap in the corrosion literature in the area of review articles. The first volume is to be published in 1969.

Lectures

Dr. Fontana has given a multitude of talks and lectures before local professional societies, national organizations and international conferences. The following is a list of some of his more recent and noteworthy presentations.

Lectures (con't)

1. Plenary Lecture, Second International Congress on Metallic Corrosion, 1963.

2. Sauver Lecturer in 1964 at the American Society for Metals, Philadelphia Chapter. This lecturer is traditionally one of the outstanding contributors to metallurgical engineering.

3. Presented one of the two invited lectures (one from UK and one from US) before the first Corrosion Conference sponsored by the South African Council for Scientific and Industrial Research, 1965.

4. Presented several lectures in the Soviet Union while a member of the six-man Corrosion Exchange, USA-USSR, 1963.

Patents

1. Testing device for erosion-corrosion. (Based on failures of centrifuge).

2. Cupric ion as inhibitor in sulfuric acid. (Based on solution of a severe corrosion problem in an acid recovery plant).

3. Wrought corrosion resistant alloy.

4. Corrosion indicator, predictor and recorder - device based on simple corrosion principle (passivation - activation) indicates when corrosion will occur in the near future.

5. New high silicon iron alloy for improved corrosion resistance (also used in cathodic protection with impressed currents) (Duriron Company) Patented in US (No.3,129,095) and Canada (No.647,648).

6. Process and equipment for directly reducing beneficiated iron ore in powder form to steel and iron.

7. High strength corrosion resistant stainless alloy (age hardenable). Production of alloy reached substantial stage in 1964 and rate increasing (OSU).

Products Developed

1. Plastics. He initiated and encouraged use of nonmetallic

Products Developed(con't).

equipment by the Duriron Company, Inc. Durcon (epoxy) laboratory sinks in high production for several years; also Durcon pipe and pumps. He made first industrial application of nylon (spin bucket bushings), pioneered use of Teflon as a gasket material, and initiated use of baked phenolic coatings for battery acid tank cars.

2. Encouraged use of New Metal--Titanium. He was involved in two of the largest installations of titanium in the chemical industry.

3. Developed Alloy 20 (Durimet 20, Aloyco 20, etc.): This alloy is the standard alloy for pumps, valves, and other parts handling sulfuric acid. Thousands of valves and pumps made of this alloy were installed during World War II in powder and acid plants. Durimet 20 is also used in many other environments. The same alloy is used in wrought form as Carpenter Stainless 20. About $1,500,000 has been collected in royalties on this alloy (not by him).

4. Developed High Strength Stainless Alloy (CD-4MCu). This alloy is used where corrosion resistance plus high strength and/or hardness are required. Approximately $9,000 has been collected by The Ohio State University in royalties. Use of the alloy is steadily increasing.

5. High Silicon Iron for Impressed Current Anodes. Dr. Fontana made the original suggestion and initiated use of high silicon iron (Fe-14.5% Si) for impressed current modes used in cathodic protection. As an example of application, the "world's largest" building at Cape Kennedy has underground lines protected by high silicon iron anodes.

6. Corrosion Test Equipment. He developed test equipment for determining the resistance of materials to erosion-corrosion. This equipment is available on a commercial basis.

7. Students. The most important product of an educator is his students. Despite his responsibilities as Department Chairman, Dr. Fontana gives a corrosion engineering course (two sessions per year.) These courses are attended by students from Welding, Civil, Mechanical, Electrical and Chemical Engineering as well as those from Metallurgical Engineering. An average of 35 students per quarter attend the engineering type course.

Dr. Fontana has personally supervised the work of at least 70 graduate students mainly in the field of corrosion.

8. Corrosion Center. He obtained funds and designed 23 laboratories in the new Metallurgical Engineering complex for a Corrosion Center. This Center is a formalization of the substantial program in corrosion conducted by Dr. Fontana and Dr. Beck. The program of the Center includes an expanded research program, an information center, an expanded academic program, and a regular program for practicing engineers. This program is aimed at bringing the science of corrosion closer to engineering. Dr. Fontana has consistently emphasized the importance of conducting work for industrial as well as governmental sponsors. Approximately 60% of the research work which he personally supervises is non-government.

9. In addition, he has made significant contributions to the selection of materials of construction in plants where there are highly corrosive environments. It is the selection of reliable materials for critical processing steps that, after all, determines the profitability (as measured by downtime, contamination of the product, and replacement costs) of the operation.

Consulting Activities

Dr. Fontana is in wide demand as a consultant on corrosion problems largely because he has a knack for translating the principles of corrosion science into solved problems in corrosion engineering. While he regularly consults for various companies he has turned down many attractive consulting arrangements because of University duties.

1. Presently he has annual retainer arrangements with the Duriron Company (Dayton, Ohio), American Potash and Chemical Corporation (Trona, California), and Mallinckrodt Chemical Works (St. Louis, Missouri).

Professional Educator

Dr. Fontana was appointed to the rank of full professor at the age of 35. A rank unusual at that time for a man of his age.

He has been able to attract and keep staff members of unusually high quality. One member of his staff has received the Hardy Medal given annually by the American Society for Metals to the most promising young metallurgist under 30; four have received the Bradley Stoughton Award given annually by the American Society for Metals to the best teacher in Metallurgy under 35, and one has received the Howe medal given by ASM annually for the best paper in the ASM Transactions.

Dr. Fontana has worked to prevent "inbreeding" of his staff - so important in building a strong department. Universities represented on his staff are: MIT (2), Carnegie (3), University of Pittsburgh (1), Cornell (2), Brooklyn Polytech (1), University of Michigan (2), Ohio State (2), University of Bristol (England) (1). The two Ohio State graduates are in the corrosion area - both considered to be outstanding. This is significant because no other university produces Ph.D. students having the broad corrosion background emphasized by Fontana.

Every member of the Metallurgical Engineering staff has his doctoral degree.

Offices, Technical Committees and Participation in National Societies

1. President, Vice President, Chairman of Technical Practices Committee, National Association of Corrosion Engineers.

2. Chairman, Corrosion Division of Electrochemical Society.

3. American Society for Metals, National Nominating Committee, Howe Award Committee, Publications Committee, and all local chapter offices.

4. Editor, Corrosion, monthly journal of the National Association of Corrosion Engineers, 1962 to date.

5. Licensed professional engineer since 1946.

6. Formerly member of Corrosion Panel of the Research and Development Board, National Military Establishment.

7. Served on Technical Advisory Committee on the National Bureau of Standards (AIME representative).

8. Member of the NASA advisory board on materials.

Honors and Awards

1. Distinguished Alumnus citation from University of Michigan in 1953.

2. Frank Newman Speller Award from the National Association of Corrosion Engineers in 1956. This is awarded once annually in recognition of outstanding contributions to the practice of Corrosion Engineering.

3. Sauveur Lecturer in 1964 at the American Society for Metals.

4. Who's Who in America (since 1954).

5. Elected to National Academy of Engineering, 1967.

6. University of Michigan Sesquicentennial Award, 1967.

7. Sphinx Award, Ohio State University, 1966 (two awarded each year to members of the faculty-at-large by students).

8. Western Electric Fund Award for "Excellence in Instruction of Engineering Students" given by ASEE Section Awards Committee, 1969.

9. Regents' Professor, State of Ohio, 1967.

10. Selected as the recipient of ASM Honorary Membership by the Board of Trustees of the American Society for Metals. Forty-three awards of this highest honor of the ASM have been given since 1919. (To be presented in Philadelphia, October 14, 1969).

11. Honorary societies: Sigma Xi, Tau Beta Pi, Phi Lambda Upsilon, Iota Alpha, Phi Eta Sigma, and Texnikoi.

CONTRIBUTIONS TO EDUCATION

Building Metallurgical Engineering Department at Ohio State

When he came in 1945 there were three members in the department and three doctorate degrees had been granted in its history. Today there are fourteen full-time staff members in the Department. Twenty Ph.D's have been granted during the last three years.

In addition there is a Battelle Visiting Professor. The Department stands high nationally. Quoting from a letter to Ohio State President Novice G. Fawcett from Dr. W. C. Leslie, Assistant Director of the Fundamental Research Laboratory of U.S. Steel Corporation and recent Battelle Professor: "From my own observations, and from discussions with other members of the profession, I can tell you that this department must be rated in the first five of its field in the nation."

Program in Corrosion Education

Despite the fact that deterioration of metals is a major limitation in the use of materials, there was practically no formal university program in the country in 1945. Dr. Fontana organized three formal courses and instituted a program in corrosion research which has since produced many outstanding corrosion engineers, numerous firsts, and many important advances in technique. He has pioneered in the use of movies to study corrosion process and to educate students.

Formalization of Concepts in Corrosion Engineering. The task of understanding is always lightened if a frame of reference is available for the less-well-initiated to have as a start. Professor Fontana has contributed the following two important conceptual devices in corrosion engineering education.

(a) Types of corrosion and methods of combating corrosion. Professor Fontana has developed his well known "Eight Forms of Corrosion" and "Eight Methods of Combating Corrosion."

(b) "Mils per year" as a standard method (in 1946) for expressing loss of metal or other degradation of material surfaces. This term is expressed by the formula

$$mpy = \frac{534W}{DAT}$$

and is now in general usage for presenting information. (mpy = mils of metal lost per year, W = weight lost, D = specific gravity, A = area, T = time of test).

Continuing Education for Practicing Engineers

The Department has sponsored several short courses in corrosion. In fact, Ohio State was a leader in sponsoring short courses in corrosion.

In the newly established Corrosion Center special short laboratory-lecture programs are conducted for engineers from industry.

Emphasis on Advanced Education in Metallurgical Engineering

He obtained a grant of $95,000 from the Ford Foundation in April, 1965 for an experiment in graduate engineering education. Briefly, the program consists of a terminal Master's program where the graduate intends to practice engineering. The thesis is a plant production problem.

Contributions to College of Engineering

Professor Fontana has contributed actively to the strengthening of the general program in the College of Engineering. Serving terms on almost every committee of the College he is presently a member of the Executive Committee of the Engineering Experiment Station Advisory Council. Helped initiate the first Annual Conference for Engineers in 1953 and devised the title (ACE). He was on the Building Committee that charted major building programs for the College of Engineering.

Contributions to the University

During 1964-65 he was chairman of the Faculty Advisory Committee. This committee, the highest faculty body of the University, is elected by the entire University faculty and advises the President and Board of Trustees. As chairman he was responsible for coordinating a faculty presentation to the University's Board of Trustees concerning the controversial "speaker's rule." He contributed greatly to maintaining the peace on the campus, and through his efforts the campus was spared some of the inflammatory invective from both sides which might have resulted. The final recommendation made by this committee had the unanimous agreement and support of the committee and general endorsement of the University administration and faculty. He has just been re-elected to this body for three years.

Advisor to Student Organization

Dr. Fontana has participated actively as adviser to various student organizations. He recently completed a four year term as advisor to the student chapter of Tau Beta Pi.

Encourage High School Age Students to Enter Engineering

Under Dr. Fontana's direction a special 24 page illustrated booklet was prepared by Dr. Staehle to attract high school students to metallurgical engineering. He encourages his staff to maintain contacts with the high schools. Two to three tours for high school students each year are conducted through the metallurgical engineering facilities.

Acknowledgements as an Outstanding Educator

Professor Fontana has received many citations for his work in the field on engineering education. Foremost among these are his selections as a Regent's Professor in the State of Ohio Higher Educational System, the Westinghouse Fund Award, and the establishment of the "Mars G. Fontana Teaching Award" by the undergraduate students of the Department of Metallurgical Engineering at Ohio State to be presented annually to a member of the department faculty for excellence in teaching.

Profile of Faculty Members

The profiles of faculty members are presented in the following sequence

1. Name
2. Academic Rank
3. Degrees
4. Years of Service on Faculty
5. Related Industrial and Professional Experience
6. Areas of Interest
7. Other University Activities
8. Awards, Honors, and Outstanding Achievements
9. National Society and Government Committee Assignments

1. Franklin H. Beck

2. Professor

3. B. S. Metallurgical Engineering, 1943, Penn. State Univ.
   M. S. Metallurgical Engineering, 1947, O. S. U.
   Ph.D. Metallurgical Engineering, 1949, O. S. U.

4. Research Assistant Professor, 1949
   Assistant Professor, 1952
   Associate Professor, 1955
   Professor, 1959-1969

5. Dupont Company, 1943-1946
   Experimental Station, Wilmington, Delaware
   Grasselli Laboratories, Cleveland, Ohio
   Manhattan Project, Richland, Washington

6. Research in aqueous corrosion phenomena, electrochemical studies, high temperature oxidation, stress corrosion cracking and hardening mechanisms in alloy systems

7. Director of Metal Research at Engineering Experiment Station - 1954-1969

8. Young Author Award (National Association of Corrosion Engineers), 1952

9. Co-Editor "Corrosion" - NACE Journal of Science and and Engineering, 1962 - present.

   Committee on Corrosion Resistant Metals, Institute of Metals Division, Metallurgical Society of AIME - 1967 - present.

   Committee A-3 on Cast Iron, ASTM, 1960-66.

1. William M. Boorstein

2. Assistant Professor

3. B.S., Metallurgical Engineering, University of Michigan, 1961
   M.S., Metallurgical Engineering, University of Michigan, 1963
   Ph.D., Metallurgical Engineering, University of Michigan, 1967

4. Assistant Professor, 1967

5. Analytical Chemist and Assistant Metallurgist, Liberman and Gitten Metal Company, Grand Rapids, Michigan, Summers 1958-60
   Research Assistant, Department of Chemical and Metallurgical Engineering, University of Michigan, Summers 1961-62
   Research Associate, Department of Chemical and Metallurgical Engineering, University of Michigan, 1962-1966.

6. Kinetics of high temperature reactions, process metallurgy

1. John P. Hirth

2. Professor

3. B. Met. E., OSU, June 1953
M.S. Met. E. OSU, 1953
Ph.D., Carnegie Institute of Technology, 1957

4. Mershon Associate Professor of Materials Science and Metallurgy, OSU, 1961-64; Professor in Met. E. Department since 1964

5. Metallurgist, General Electric Company, 1953
Task Scientist, 1st. Lt. U.S. Air Force, Aeronautical Research Laboratory, 1953-55
Research Metallurgist and Assistant Professor of Metallurgical Engineering, Carnegie Institute of Technology, 1958-61

6. Nucleation phenomena, dislocations, diffusion, corrosion and kinetics. Present research includes work on equilibrium dislocation configurations, studies of crystal growth processes, measurments of energies of surfaces and theoretical aspects of nucleation phenomena

7. Goals Committee of the College of Engineering, 1966-67
University Honors Committee, 1967-68
Ad-Hoc University Committee on Athletic Facilities, 1968-69
Graduate School Postdoctoral Committee, 1967
Graduate School Fellowship Committee, 1967-68
Graduate Advisory Committee on Engineering 1968-69
Graduate Council 1969-72

8. Visiting Professor of Materials Science, Stanford University, 1968-69
Visiting Research Scientist, University of Oslo, Norway, Summer, 1964
Bradley Stoughton Award of the American Society of Metals for the Outstanding Teacher of Metallurgy in the U.S.A. under the age of 35, 1964
Curtis W. McGraw Award ($1,000) of the American Society for Engineering Education for outstanding early achievement by engineering college research workers under age 40, 1967

Fulbright Research Fellowship, University of Bristol, England, 1957
Hardy Gold Medal of the American Institute for Mining and Metallurgical Engineers for the Outstanding Metallurgist in North American under age 30, 1960
Mershon Associate Professor of Materials Science and Metallurgy, The Ohio State University, 1961-64
Biographical listings in:
(a) Outstanding Young Men in America, 1967
(b) American Men of Science, 1962
(c) Who's Who in the Midwest, 1969

9. Chairman, Physical and Chemical Metallurgy Committee, AIME, 1967-68
Chairman, Physical Metallurgy Gordon Conference, 1967
Chairman, Transactions Committee, ASM, 1969-70

1. James O. Lord (deceased)*

2. Professor

3. Bachelor of Chemical Engineering, OSU, 1915

4. Instructor and Professor , 1921-1958

5. Open Hearth Furnace Operation, U.S. Steel, Gary, Indiana, 1915-1917
   U.S. Army, Chemical Warfare Branch, 1917-1918
   Metallography, U.S. Steel, 1918-1921

6. Metallography of iron, steel and alloy systems

7. Produced several educational movies for American Society of Metals

8. One of the leaders in the early development of metallographic techniques for iron and steel while at U.S. Steel Corporation and Ohio State.

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*See attached memorial biography

JAMES OSBORN LORD

(A Memorial Biography)

James Osborn Lord, Professor of Metallurgical Engineering at The Ohio State University, died of a heart attack on October 13, 1958, at the age of sixty-six. Thus ended a long career of faithful service to the University, the community, and the country.

Professor Lord was born in Columbus, Ohio, on December 8, 1891. His father was Nathaniel Wright Lord, after whom Lord Hall was named, and his mother was Susan Osborn Lord. He graduated from Columbus North High School in 1910 and then attended The Ohio State University, graduating 1915 with the degree Bachelor of Chemical Engineering.

Leaning strongly toward metallurgy because of his father's interest and his environment, he joined the staff of the U.S. Steel Corporation at Gary, Indiana. Here he had practical experience with open hearth furnace operations. Later he transferred to Technical Service, where he continued until December, 1917, when he enlisted as a Sergeant with the then beginning Chemical Warfare Branch of the National Army. During this enlistment, he was stationed at Niagara Falls with the Oldbury Electrochemical Company where the toxic gas phosgene was being produced. He aided in the development of phosgene and the handling of this gas. Many of the methods employed here were later used in the development and construction of the main plant at Edgewood.

In December, 1918, he was honorably discharge as Second Lieutenant, Chemical Warfare Service. Professor Lord returned to his former position at Gary, where he became very much interested in metallographic techniques for iron and steel identification, then in its infancy. His keen interest in this field and his expert handling of photomicrography soon stamped him as one of the outstanding men in this field. This led to his appointment as Instructor of Metallurgy at The Ohio State University in September, 1921. His great interest in metallography continued until his death.

Professor Lord was a member of Sigma Xi on the campus and an Honorary Member of Alpha Chi Sigma Fraternity. He was

a member of the American Institute of Mining, Metallurgical, and Petroleum Engineers, the American Society for Metals, of which he was a Charter Member of the Columbus Chapter. He produced several educational movies for the American Society for Metals. He also belonged to the Open Court on the Campus, the Campus Photographic Society, the Columbus Philatelic Society, and the Faculty Club. His stamp collection, which he originally started for his son, is one of the best in Columbus. He was very active at the Overbrook Presbyterian Church, where he served on the Board of Trustees and as Elder.

Professor Lord was a licensed Chemical and Metallurgical Engineer. He was author of the book Alloy Systems, which is being used at a number of universities. He is also the author of a number of papers, principally in the American Ceramic Society on Metal Surface Preparation for Enameling. Since 1942, he has been active in sponsored research administered through the Research Foundation.

Professor Lord was an ardent lover of the outdoors. His principal interests here were fishing, astronomy, and photography of the caves and hills in the southern counties of Ohio. He was a member of the Zanesfield Rod and Gun Club, and many of his friends have enjoyed his invitation to a good day of fishing at this Club. His fish dinners prepared by himself on these occasions were legend.

Professor Lord was a man of keen interest in his work. Only perfection satisfied him, and yet he was always ready to aid those who had trouble attaining this standard. His untiring efforts and patience with his students, and his willingness to aid them professionally will be remembered for a long time.

Professor Lord is survived by his wife, Josephine Bye Lord; a son, Joseph Keith of New York City; a daughter, Mrs. W. Newton Mote of Versailles, Indiana; and two grandchildren.

1. Glyn Meyrick

2. Associate Professor

3. B.S., Physics, University of Bristol, England, 1956
   Ph.D., Physics, University of Bristol, England, 1960

4. Associate Professor, 1968-

5. Research Fellow, in Metallurgy, Carnegie Institute of Technology, 1960
   Assistant Professor, Metallurgical Engineering, Carnegie Institute of Technology, 1960-1962

6. Physical Metallurgy, mechanical properties of alloys, field ion microscopy.

7. Head Coach of Ohio State Rugby Team, Big Ten Champions, 1969,

9. Member of Committee of Materials and Testing Group of Institute of Physics and Physical Society, (England 1965)
   On the Basic Properties Committee of the Inter-Services Metallurgical Research Council (1966-67 England)

1. Khosrow L. Moazed

2. Associate Professor

3. B. S. Physics, Rensselaer Polytechnic Institute, Troy, New York, 1953
   M. Met. E., Rensselaer Polytechnic Institute, Troy, New York, 1956
   Ph.D., Carnegie Institute of Technology, 1956-59

4. Assistant Professor,1959-1963
   Associate Professor,1963-1968, Resigned in 1968.

5. Research Associate, Rensselaer Polytechnic Institute, Troy, New York, 1953-1956
   Project Engineer, Carnegie Institute of Technology, Pittsburgh, Pennsylvania 1956-1959

6. Research and publications on Surface Phenomena, Phase Transformation in Solids, and Evaporation and Condensation Phenomena

1. William A. Mueller (deceased, April 17, 1969)

2. Professor

3. Engineer of Mines, OSU, 1911

4. Special Instructor in Metallurgy, February-July, 1920
   Assistant Professor, 1920-1925

5. Millman and Chemist, Detroit Copper Mining Company and Unites States Bureau of Mines, 1912
   Assayer and Chief Chemist, American Platinum Works, Newark, New Jersey, and Ricketts and Banks, New York City, 1913
   Assistant Metallurgist, Inspiration Consolidated Copper Co., Miami, Arizona, 1914
   Field Engineer and Research Metallurgist, General Engr., Salt Lake City, 1915-1918
   Captain Chemical Warfare Service, U.S. Army, 1918
   Mining Engr. and Consulting Engr., Southern Gypsum Co., North Holston, Virginia, 1919-1920

6. Iron, Steel, and fuels (especially coal), as well as non-ferrous metallurgy

1. James A. Parsons

2. Adjunct Professor

3. Electrical Engineer, Rensselaer Polytechnic Institute, 1922

4. Adjunct Professor, 1967

5. Duriron Company, Inc., Dayton, Ohio 1922-1953
   1922-28 - Development of Aluminum Bronze and High Silicon castings
   1928-41 - Research and development of stainless steel alloys and high-silicon alloys
   1941-45 - Supervisor, production of Metal alloys for use with smokeless powder, and also special materials for Manhattan Project
   1945-53 - Director of Laboratory Research and Control
   Professor of Metallurgy and Head of Division of Metallurgy, Mechanical Engineering Department, Tennessee A.& I State University, 1953-1966.
   Dean, School of Engineering, Tennessee A. & I. State University, 1957-1959.
   Resigned as Dean to devote full-time to teaching Metallurgy, 1959-1966.

6. Metallography, iron and steel alloys, corrosive resistant alloys, metallurgical analysis by use of resistivity determination and spectrophotometric procedures.

8. Harmon Award for achievement in a special field among Negroes, 1927
   Honorary Doctor of Science Degree, Wilberforce University, Wilberforce, Ohio
   Citation for Recognition of Meritorious Contributions to the science of metals in the field of Corrosion Resisting Alloys. American Society for Metals (Dayton, Ohio Chapter), 1953

1. Gordon W. Powell

2. Professor

3. B. S., Massachusetts Institute of Technology, 1951
   M. A., Massachusetts Institute of Technology, 1952
   Sc.D., Massachusetts Institute of Technology, 1955

4. Professor - Metallurgical Engineering Department, 1958-1969

5. Research Metallurgist; Nuclear Metals, Inc., 1955-57
   Assistant Professor; University of Wisconsin, 1957-1958

6. Studies of eutectoid decomposition, mechanism of the Kirkindall effect, magnetic properties of plain carbon steels, and an electron diffraction study of quartz

8. 1967 - Award for best paper submitted to Molding Methods and Materials Group of the American Foundry Society, 1968 - Mars. G. Fontana Teaching Award

9. Publications Committee, AIME, 1965-68

1. Robert A. Rapp

2. Professor

3. B.S., Met. Engr., Purdue University, 1956
   M.S., Met. Engr., Carnegie Institute of Technology, 1959
   Ph.D., Met. Engr., Carnegie Institute of Technology, 1960

4. Assistant Professor in Metallurgical Engineering, 1963-1966
   Associate Professor in Metallurgical Engineering, 1966-1969
   Professor in Metallurgical Engineering, 1969

5. Fulbright Scholar, Max Planck Institute, Germany, 1959-1960
   Research Metallurgist, U.S. Air Force, Wright-Patterson AFB, 1960-1963
   Metallurgist, Westinghouse Electric Company, Summer, 1965
   Metallurgist, Thompson Product Company, Summer, 1957

6. Solubility and diffusivity of oxygen in copper, passivation of alloys at high temperatures, thermodynamic properties of liquid iron-carbon-oxygen alloys, lattice defects in compounds at high temperatures, and high-temperature electrochemical techniques.

7. John Bray Award, Purdue University, 1956
   Fulbright Scholar, Max Planck Institute, Germany, 1959
   ASM Bradley Stoughton Young Teacher Award, 1967
   M. G. Fontana Teaching Award, 1968-69

9. Chairman, Physical Chemistry of Extractive Metallurgy Committee, :E.M. Div. of AIME, 1965
   Chairman, Papers and Program Committee of Extractive Metallurgy Division of AIME, 1969
   Chairman, Publications Committee, Iron and Steel Division of AIME, 1967
   NASA Research Advisory Committee on Materials for Aircraft Engines, 1968 - present
   Materials Advisory Board Panel on Hot Corrosion of Superalloys, 1968-69

1. Laurie Rautio

2. Assistant Professor

3. B. Met. Engineering, OSU, 1931

4. Instructor, 1936-1943
   Assistant Professor, 1943-1945
   Resigned to go into industry, 1945

5. Open Hearth Metallurgist, American Rolling Mills,
   Ashland, Kentucky, 1931-1936

6. Metallography and metal-working

1. David A. Rigney

2. Assistant Professor

3. B.A., Chemistry & Physics, Harvard University, 1960.
   M.S., Metal Physics Group, Division of Engineering & Applied Physics, Havard Graduate School, 1962.
   Ph.D., Materials Science and Engineering, Cornell University Cornell University, 1966.

4. Assistant Professor, 1968-

5. Metallurgist, Computer Products Division, Laboratory for Electronics, Inc., Boston, Mass., 1962
   Post-doctoral Research, University of Illinois, 1966-68

6. Solidification; Liquids and Physics of Metals

1. Rudolph Speiser

2. Professor

3. B. A. Chemistry, OSU, 1938
M. A. Chemistry, OSU, 1940
Ph. D. Physical Chemistry, Polytechnical Institute, New York, 1942

4. Lecturer - 1949 (Metallurgical Engineering)
Associate Professor, 1950, Professor 1957.

5. Research fellow and part-time instructor of Polytechnical Institute, Brooklyn, New York, 1940-42
Assistant Physical Chemist; Eastern Regional Research Lab Department of Agriculture, Philadelphia, Pennsylvania, 1942-46
Lecturer for American Chemical Society in Philadelphia (Winter of 1945)
Associate Supervisor at Cryogenic Laboratory - OSU, 1946-49
Metallurgist - Edgar Thomson Work of United States Steel Corporation at Braddock, Pennsylvania - Sumer 1953

6. Physical properties of metals and metal oxides. Current research - thermodynamics of binary equilibrium diagrams, the kinetics of phase transformations, the oxidation of metal and alloys, physics of the solid state, structure and behavior of metal surfaces, defect structure, and electron theory of metals

7. Nuclear Engineering Committee, 1964-68

9. Chairman of High Temperature Chemistry, Gordon Conference, 1953
Member, Visiting Scientific Advisory Committee, Atomic Energy Commission, Oak Ridge National Laboratory, 1956.
Member, NSF Graduate Fellowship Program of National Academy of Science, 1967-70.
Member, Advisory Board on Molybdenum High Temperature Applications, Office of Naval Research, 1951

1. George R. St.Pierre

2. Professor

3. B. S. Metallurgy, Massachusetts Institute of Technology, 1951
Sc. D. Metallurgy, Massachusetts Institute of Technology, 1954

4. Professor, 1957-1969

5. Supervising Research Metallurgist, Inland Steel Co., 1954-56
Lecturer, Calumet Extension of Purdue University, 1954-56
Project Officer, (Lt.) Wright Patterson AFB, 1956-57

6. Application of thermodynamics to metallurgical problems; analysis of metallurgical processes including interactions between gases, liquid metals and slags; oxidation of alloys; thermodynamic properties of liquid alloy systems including vapor pressures, electromotive force measurements, and theoretical models for predicting such behavior; steelmaking.

7. Member of Faculty Advisory Committee to the President and Board of Trustees, 1966-69 (Chairman, 1968-69)
Member of Faculty Advisory Committee to Ohio Board of Regents, 1968-69
Member of Faculty Council, 1969-72
Member of Open Housing Panel, 1969-71
Faculty Advisor to the Student Metallurgy Club, 1960 - present
Member of Graduate School - Engineering Committee
Associate Dean of the Graduate School, Ohio State University, 1964-66

8. Bradley Stoughton Award of the American Society for Metals for the Outstanding Young Teacher of Metallurgy in the U.S.A. 1961
Fellow, American Institute of Chemists, 1969
Mars G. Fontana Teaching Award (O.S.U.) 1967
Listed in Who's Who in American (1966) and in many other biographical compilations.
Visiting Scientist, Edgar Bain Laboratories, U.S. Steel, 1957
NATO Lecturer, Oslo, Norway, 1963

9. Chairman, Publications Committee of Iron and Steel Division, AIME, 1965

Member, Publications Committee, The Metallurgical Society 1964-67
Chairman, Proceedings Publication Committee, ISD-AIME, 1969-70

1. Edward E. Somermeir (deceased)

2. Professor

3. B.S. Pharmacy, OSU, 1898

4. Instructor in Metallurgy, 1898
   Assistant Professor, 1905-1907
   Associate Professor, 1907-1911
   Professor, 1911-1918
   Chairman of Department of Metallurgy and Mineralogy, 1911-1913

5. Chemist, U. S. Geological Survey, Fuel Testing Plant, St.Louis under N. W. Lord, 1904-1905

6. Chemical metallurgy and analysis of fuels

   Professor Somermeir published a volume on coal, and wrote several papers in chemical and physical journals. He died on March 26, 1919 from tuberculosis.

1. Joseph W. Spretnak

2. Professor

3. B.S. Met. E., Ohio State University, 1938
M. S. Met. E., Case Institute of Technology, 1940
Ph.D. Met. E., University of Pittsburgh, 1948

4. Professor 1948-69

5. United States Steel Corporation, Research Center, Monroeville, Pennsylvania, 1957
Metals Research Laboratory, Carnegie Institute of Technology - Supervisor of research on various phases of production of artillery tubes, 1943-1948
National Malleable and Steel Castings Co., Cleveland, Ohio; Research Metallurgist, 1940-1943
Department of Metallurgy, Case Institute of Technology, Graduate Assistant, 1938-1940

6. Research in solidification of metals, steel ingots, quench cracking of steels, interstitial solid solutions, the boron hardenability effect, vapor pressure of metals, solid state transformations, strengthening mechanisms of metals, properties of castings, thermodynamics, oxidation, fracture of metals, plastic instability, internal friction, low temperature properties, metal working and engineering metallurgy.

7. Council on Academic Affairs
Subcommittee on Physical Sciences
Curriculum Committee of Engineering College (7 years)
Faculty Council
Graduate Council
Mershon Committee
Editorial Board of University Press
Advisory Council of Engineering Experiment Station
Teaching at Wright-Patterson Air Force Base

9. Army Officer - Professor Study Group at OSU to develop national curriculum for Army ROTC
Publications Committee - ASM, AIME

Physical Metallurgy Committee - AIME
Chairman - Ohio Valley Section of AIME, Columbus Chapter of ASM
Committeeman - NRC Committee, Advisory to US Army Research Office (Durham), in Basic Research

1. Roger W. Staehle

2. Associate Professor

3. B. Met. E., OSU, June, 1957
   M.S. Met. E., OSU, June 1957
   Ph.D. Met. E., OSU, June, 1965

4. Assistant Professor in Metallurgical Engineering 1965-67
   Associate Professor, 1967-

5. Naval Reactors Branch, Atomic Energy Commission under Admiral Hyman Rickover, 1957-61
   Westinghouse Bettis Reactor Engineering School, 1959

6. Properties of nuclear reactor materials, corrosion mechanisms, and the effect of environments on mechanical properties. Presently conducting a broad program to study mechanisms of stress corrosion cracking.

7. Chairman of College of Engineering Committies on "Honorary Degrees and Honors", 1969
   College Committee on "High School Conference", 1969

8. E. G. Bailey Award from OSU College of Engineering for meritorious service, 1967
   Robert M. Critchfield Award from OSU College of Engineering for meritorious service, 1969
   At age 34, Chose as Plenary Lecturer during the Fourth International Conference on Metallic Corrosion, Amsterdam, September, 1969. (Previous recipients over 50 years old).
   Appointed rapporteur for the International Conference on the Metallurgy of Titanium, London, 1968
   He has obtained sponsored research efforts in corrosion totaling over $200,000/year.

9. Member of the Executive Committee for Corrosion Division of Electrochemical Society.
   Member of Corrosion Resistant Metals Committee for AIME.
   Member of Research Committee for NACE.

1. Douglas C. Williams

2. Professor

3. B. S. Chemistry, Beloit College, 1930
   M. S. Engineering, Cornell University, 1945
   Ph. D. Engineering, Cornell University, 1947

4. Industrial Engineering Staff, 1947-54
   Professor Metallurgical Engineering, 1954-1969

5. American Steel Foundries, 1942-43
   American Foundryman's Society Research Fellow, 1943-1947

6. Research in thermal conductivity of green sand mixtures, the use of exothermic pads, fluid flow of molten metal, control of variables affecting cohesion of molding sands, and the movement of particles during compaction.

7. Faculty Advisor to "The Ohio State Engineer", 1956 - present
   Secretary, O.S.U. Fire Drill Committee, 1952 - present

8. Best annual technical paper award - Sand Division, American Foundrymen's Society, 1965 and 1967 (only recipient who has received this award twice).
   George O. Hayes Award, American Society for Engineering Education, 1969

9. Executive Committee of Molding Methods and Material Group - American Foundrymens Society. Fourth term at present.
   Basic Concepts Committee of Molding Methods and Materials Group - American Foundrymens Society, 1955-59., 1963 - present
   Member of Engineering Student Magazine Advisors Committee of American Society for Engineering Education

Publications of Faculty

Franklin H. Beck

1. "Nature and Mechanism of Passivity" (with M. G. Fontana), Metal Progress, pp. 939-44, June, 1947.

2. "Passivation of Stainless Steels," Engineering Experiment Station News, Vol. XIX, No. 5, pp. 32-38, December, 1947.

3. "Fluorine Corrosion", (given recognition by authors for providing much of material for paper while employed by E. I. duPont in Wilmington, Delaware), AEC publication MDDC-1465, 1947.

4. "The Nature and Mechanism of Passivity in 18-8S Stainless Steel", Dissertation for doctorate, The Ohio State University, March, 1949.

5. "Passivity of Metals" (with M. G. Fontana, Marjorie Lassettre and R. Speiser), Journal of Chemical Physics, Vol. 18, p. 772, 1950.

6. "Materials for Handling Fuming Nitric Acid", prepared and delivered at special meeting at Pentagon, Washington, D.C., Classified, presented 1950.

7. "Relations Between Solution Potentials and Susceptibility of Stainless Steel to Selective Corrosion", (with M. G. Fontana and L. R. Standifer), Engineering Experiment Station News, Vol. XXIII, No. 4, October, 1951.

8. "Cause and Cure of Knife-Line Attack in Columbium Stabilized Steels" (with.M. G. Fontana and M. L. Holtzworth), Engineering Experiment Station News, Vol. XXIII, No. 4 October, 1951.

9. "The Mechanism of Knife-Line Attack in Welded Type 347 Stainless Steel (with M. G. Fontana and M. L. Holtzworth), Corrosion, Vol. 7, No. 12, pp. 441-49, December, 1951.

10. "Formation of Some Oxides on Stainless Steels at High Temperatures" (with H. M. McCullough and M. G. Fontana), Trans. A.S.M., Vol. 43, 1951.

11. "The Mechanism of Scale Formation on Iron at High Temperatures" (with M.G. Fontana and B. W. Dunnington), Corrosion, Vol. 8, No. 1, pp. 2-13, January, 1952. (Received Young Author's Award for this paper).

12. "Corrosion by Aqueous Solution at Elevated Temperatures and Pressures" (with M. G. Fontana), Corrosion, Vol. 9, No. 8, pp. 287-93, August, 1953.

13. "Electrolytic etching in Oxalic Acid Used to Screen Cast CF-8 and CF-8M Stainless Steels from the 240-Hr. Nitric Acid Test" (with N. D. Greene and M. G. Fontana), ASTM Bulletin, No. 195, p. 68, January, 1954.

14. "Motion Pictures as Corrosion Research Aid" (with M. G. Fontana), News in Engineering, Vol. XXVI, No. 4, pp. 3-9, October, 1954.

15. "Polarization Studies of Copper, Nickel, Titanium and Some Copper and Nickel Alloys in Three Per Cent Sodium Chloride" (with H. B. Bomberger and M. G. Fontana), Journal Electrochemical Society, Vol. 102, No. 2, pp. 53-58, February, 1955.

16. "Galvanic Corrosion and Erosion Corrosion of Some Metals and Alloys by Strong Nitric Acid" (with J. F. Willging, J. P. Hirth and M. G. Fontana), Corrosion, Vol. 11, No. 2, pp. 31-39, February, 1955.

17. "Stress-Corrosion Mechanism in a Magnesium-Base Alloy" (with D. K. Priest and M. G. Fontana), Trans. A.S.M., Vol. 47, No. 18, pp. 473-87, 1955.

18. "Corrosion Fatigue Testing in Highly Corrosive Media" (with W. P. McKinnell and M. G. Fontana), News in Engineering, Vol. XXVIII, No. 4, pp. 28-32, 1956.

19. "The Effect of NO, HNO_2 and HNO_3 on Corrosion of Stainless Steel by H_2SO_4" (with W. P. McKinnell, L.F. Lockwood, R. Speiser and M. G. Fontana), Corrosion, Vol. 14, pp. 27-30, January, 1958.

20. "The Sorption of Some Diatomic Gases on Stainless Steel and Iron Surfaces and its Relation to Passivity" with W. P. McKinnell, R. Speiser and M. G. Fontana), Band 62, Heft 617, 1958, (Seite 733-39), Verlag Chemie, Gmb. H., Weinheim/Bergstr.

21. "Influence of Nickel on Intergranular Corrosion of 18% Chromium Steels" (with J. R. Upp and M. G. Fontana), Trans. A.S.M., Vol. 50, pp. 759-72, 1958.

22. "Mechanism of Stress Corrosion of Austenitic Stainless Steels" (with R. W. Staehle and M.G. Fontana), accepted for publication in Corrosion within next six months, (February, 1959).

23. "Rapid Intergranular Oxidation of 18-8 Stainless Steels by Oxygen and Dry Sodium Chloride at Elevated Temperatures" (with H. W. Pickering and M. G. Fontana) Trans. ASM, 1960.

24. "Anodic Polarization Behavior of Iron - Nickel Alloys in Sulfuric Acid Solutions" (with George Economy, R. Speiser and M. G. Fontana), Jour. Electrochem Soc., Vol. 108, No. 4, April 1961.

25. "Propagation of Stress - Corrosion Cracking in a Magnesium Base Alloy as Determined by Several Techniques" (with W. M. Pardue and M. G. Fontana, Trans. ASM, Vol. 54, No. 3, Sept. 1961.

26. "Cast Chromium Nickel Stainless Steels for Superior Resistance to Stress Corrosion" (with M. G. Fontana and J. W. Flowers) Metal Progess, Dec., 1961.

27. "Wedging Action of Solid Corrosion Product During Stress Corrosion of Austenitic Stainless Steels (with H. W. Pickering and M. G. Fontana) Corrosion, Vol. 18, No. 6, June, 1962.

28. "Stress Corrosion of Austenitic Stainless Steels" (with H. P. Hawkes and M. G. Fontana) News in Engr., Vol. XXIV, No. 4, Nov. 1962.

29. "Observations on the Dissolution Behavior of Iron Whiskers" (with C. C. Seastrom and M. G. Fontana) Corrosion, Vol. 19, No. 4, April 1963.

30. "Corrosion and Age Hardening Studies of Some Cast Stainless Alloys Containing Ferrite", (with J. W. Flowers and M. G. Fontana) Corrosion, Vol. 19, No. 5, May 1963.

31. "Effect of Applied Stress and Cold work on Stress Corrosion Cracking of Austenitic Stainless Steel by Boiling 42 Percent Magnesium Chloride" (with H. P. Hawkes and M. G. Fontana), Corrosion, Vol. 19, July 1963.

32. "Dissolution of Iron Whiskers" (with R. M. Shemenski, J. P. Hirth and M. G. Fontana) Corrosion, Vol. 20, May 1964.

33. "Dissolution Kinetics and Polarization of Iron Whiskers" (with R. M. Shemenski and M. G. Fontana) Corrosion, Vol. 21, No. 2, Feb. 1965.

34. "Gas Chromatographic and Gravimetric Studies of Uranium Oxidation Mechanism", (with T. Kondo, E. D. Verink, and M. G. Fontana), Corrosion, Vol. 20, No. 10, pp. 314-340, Oct. 1964.

35. "New High Strength Alloy Grades by Structure Control", ASTM Special Technical Publication No. 369 (with E. A. Schoefer, J. W. Flowers, and M. G. Fontana), pp. 159-174, 1965.

36. "Anodic Polarization Behavior of Nickel-Chromium Alloys in Sulfuric Acid Solutions" (with J. R. Myers and M. G. Fontana), Corrosion, Vol. 21, No. 9, pp. 277-287, Sept. 1965.

37. "Corrosion, Immunity and Passivation from a Engineering Viewpoint" (with J. E. Reinoehl and M. G. Fontana) Corrosion, Vol. 21, No. 12, pp. 379-381, Dec. 1965.

38. "Orientation-Dependent Dissolution of Iron Whiskers", J. Appl. Phys., Vol. 36, No. 12, Dec. 1965, (with R. M. Shemenski and M. G. Fontana)

39. "Observations on the Anodic Behavior of Nickel and Chromium: Surface Ropography and Temperature Effect" (with J. R. Myers, W. B. Brow and R. K. Saxer) Corrosion, Vol. 22, pp. 32-38, Feb. 1966.

40. "Tunnel Formation in Iron-Nickel-Chromium Alloys", M. F. Dean, F. H. Beck, and R. W. Staehler, Corrosion July 1967, pp. 192-201.

41. "Solubility and Permeability of Sulfur in Alpha Iron", W. H. Herrnstein, III, F. H. Beck, and M. G. Fontana, Trans. AIME, Vol. 242, p. 104.

William Boorstein

1. "Galvanic Cell Measurement of the Thermodynamic Interaction between Cadmium and Tin in Liquid Bismuth," with R. D. Pehlke, Journal of the Electrochemical Society, III, No. 11, pp. 1269-1272, 1964.

2. "Kinetics of Solution of Hydrogen in Liquid Iron and Iron Alloys," with R. D. Pehlke, presented at the 1967 Annual Meeting of the AIME, Los Angeles, to be published in the AIME Transactions.

3. Measurement of Hydrogen Solubility in Liquid Iron Alloys Employing a Constant Volume Technique, William M. Boorstein and Robert D. Pehlke, submitted to Trans. AIME, January, 1969.

Dana J. Demorest

1. D. J. Demorest, "The Bismuthate Method for Manganese and a New Method for the Determination of Vanadium", Journal of Industrial and Engineering Chemistry, Vol. 4, No. 1, 4, January, April, 1912.

2. D. J. Demorest, "The Carbonization of Ohio Coals", Ohio State University, Engineering Experiment Station, Bulletin 46, Nov. 1928.

3. D. J. Demorest, "Gasification of Ohio Coals, a preliminary survey made to determine suitability and economic values of various coals for gas mating purposes." Ohio State, Engineering Experiment Station Bulletin, v.27, No. 12, Feb. 1923.

4. D. J. Demorest and N. W. Lord, "Metallurgical Analysis" (book), McGraw-Hill, 1924.

5. D. J. Demorest and F. B. Hobard, "Tests on continuous carborization of finely crushed coal by radiant heat." Ohio State University, Engr. Experiment Station, Bulletin 65, Jan. 1932.

6. D. J. Demorest, "Transition from Natural Gas to Manufactured Gas", Ohio State University, Engineering Experiment Station, Circular, No. 13, Sept. 1925.

M. G. Fontana

1. "Fundamentals of Corrosion of High Strength Steels," M. G. Fontana and R. W. Staehle. Proceedings of Seventh World Petroleum Congress. Mexico City, April 1967.

2. "General Theory of Stress Corrosion," M. G. Fontana. AGARD Paper, Turin, Italy, April 1967.

3. "Orientation-Dependent Dissolution of Iron Whiskers," R. M. Shemenski, F. H. Beck, and M. G. Fontana. J. Appl. Phys., 36, No. 12,(Dec. 1965).

4. An Experiment in Graduate Engineering Education," G. W. Powell and M. G. Fontana, J. of Engr. Edu., 56, 179-80 (Jan. 1966).

5. "Corrosion, Immunity and Passivation from an Engineering Viewpoint," James E. Reinoehl, F. H. Beck and M. G. Fontana. Corrosion, 21, No. 12, 379-81 (Dec. 1965).

6. "Anodic Polarization Behavior of Nickel-Chromium Alloys in Sulfuric Acid Solutions," J. R. Myers, F. H. Beck, and M. G. Fontana. Corrosion, 21, 277 (1965).

7. "New High Strength Alloy Grades by Structure Control," F. H. Beck, E. A. Schoefer, J. W. Flowers, and M. G. Fontana. Special Technical Publication No. 369, Advances in the Technology of Stainless Steels and Related Alloys, ASTM, 1965.

8. "Dissolution Kinetics and Polarization of Iron Whiskers," R. M. Shemenski, F. H. Beck, and M. G. Fontana. Corrosion, 21, No. 2, 39-47 (Feb. 1965).

9. "Unusual Corrosion Problems" ASM Sauveur Lecture, M. G. Fontana. Presented March 1964 at Franklin Institute, Philadelphia, Pa.

10. "Gas Chromatographic and Gravimetric Studies of Uranium Oxidation Mechanism," T. Kondo, E. D. Verink, F. H. Beck, and M. G. Fontana. Corrosion, 314t-320t (Oct. 1964).

11. "Dissolution of Iron Whiskers," R. M. Shemenski, J. P. Hirth, F. H. Beck, and M. G. Fontana. Technical Note, Corrosion, Vol. 20, 203t-204t (May 1964).

Fontana-2

12. "Effect of Applied Stress and Cold Work on Stress Corrosion Cracking and Austenitic Stainless Steel by Boiling 42% Magnesium Chloride," H. P. Hawkes, F. H. Beck, and M. G. Fontana. Corrosion, 19, 247t-253t (July 1963).

13. "Corrosion Engineering and Corrosion Science," M. G. Fontana. A Plenary Lecture presented at 2nd International Congress on Metallic Corrosion, NYC, March, 1963. Corrosion, 199t-204t (June 1963).

14. "Observations on the Dissolution Behavior of Iron Whiskers," C. C. Seastrom, F. H. Beck, and M. G. Fontana. Corrosion, 120t-127t (April 1963).

15. "Corrosion and Age Hardening Studies of Some Cast Stainless Alloys Containing Ferrite," J. W. Flowers, F. H. Beck, and M. G. Fontana. Corrosion, 186t-198t (May 1963).

16. "Wedging Action of Solid Corrosion Product During Stress Corrosion of Austenitic Stainless Steels," H. W. Pickering, F. H. Beck, and M. G. Fontana. Corrosion 18, 230t-239t (1962).

17. "Stress Corrosion of Austenitic Stainless Steels," H. P. Hawkes, F. H. Beck and M. G. Fontana. News in Engineering (Nov. 1962).

18. "Corrosion Failures," M. G. Fontana. In ASD TDR 62-396 (Air Force) Materials Central - ASM Metallurgical Educational Lectures, May 1962. AF Project No. 7381.

19. "Rapid Intergranular Oxidation of 18-8 Stainless Steels by Oxygen and Dry Sodium Chloride at Elevated Temperatures." H. W. Pickering, F. H. Beck, and M. G. Fontana. Trans. ASM, 53, 793-803 (1961).

20. "Anodic Polarization Behavior of Iron-Nickel Alloys in Sulfuric Acid Solutions," George Economy, Rudolph Speiser, F. H. Beck, and M. G. Fontana. J. Elchem, Soc., 108, No. 4 (Apr. 1961).

21. "Cast Chromium Nickel Stainless Steels for Superior Resistance to Stress Corrosion," M. G. Fontana, F. H. Beck, and J. W. Flowers. Met. Prog. (Dec. 1961).

Fontana-3

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55. "Fractographic Observations on the Fracture of Some Ultra-high Strength Steels" by J. H. Bucher, G. W. Powell, and J. W. Spretnak. Presented at Symposium on Practical Aspects of Fracture, Annual Meeting of AIME, New York, February, 1965. To be published in symposium volume by AIME.

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R. W. Staehle

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4. R. W. Staehle, "Circulating Autoclave System for Stress Corrosion Cracking Studies." ASTM-STP-425.

5. T. J. Smith and R. W. Staehle, "Role of Slip Step Emergence in the Early States of Stress Corrosion Cracking in Face Centered Cubic Iron-Nickel-Chromium Alloys," Corrosion 23 (1967), 192-201.

6. M. F. Dean, F. H. Beck, and R. W. Staehle, "Tunnel Formation in Iron-Nickel Chromium Alloys," Corrosion 23 (1967), 117-129.

7. J. W. Frey and R. W. Staehle, "Effect of Temperature on the Cracking of Fe-Ni-Cr Alloys," accepted for publication in Corrosion.

8. R. W. Staehle, "A Technical Note - Montage of Processes Operating during Stress-Corrosion Cracking," Corrosion 23 (1967), 202.

9. R. M. Latanision and R. W. Staehle, "Stress Corrosion of Iron-Nickel-Chromium Alloys" to be published in Proceedings of Ohio State Conference on Fundamental Aspects of Stress-Corrosion Cracking, Sept. 11-15, 1967, by NACE.

10. R. W. Staehle, "Introductory Remarks," to be published in Proceedings of Ohio State Conference on Fundamental Aspects of Stress Corrosion Cracking, Sept. 11-15, 1967, by NACE.

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13. R. W. Cochran and R. W. Staehle, "Effects of Surface Preparation on Stress Corrosion Cracking of Type 310 Stainless Steel" Corrosion 24, November, 1968.

14. R. M. Latanision and R. W. Staehle, "Plastic Deformation of Electrochemically Polarized Nickel Single Crystals". Accepted for publication in Acta Metallurgica.

15. R. W. Staehle, "Effects of Fabrication and Processing on Stress Corrosion of Fe-Ni-Cr Alloys" Tripartite Chemical Engineering Conference, A.I.Ch.E. Montreal, 1968 to be published in proceedings of conference.

16. M. G. Fontana, and R. W. Staehle, "Fundamentals of Corrosion of High Strength Steels" Proceedings of the Seventh World Petroleum Congress.

17. R. L. Cowan and R. W. Staehle, "The Frequency of Annealing Twins in FCC Iron-Nickel-Chromium Alloys" Trans. ASM 61, 3, 1968.

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19. R. W. Staehle, "Studies of Stress Corrosion Cracking of Fe-Ni-Cr Alloys," presented during Libby-Cockroft Exchange Lectures, to be held at Harwell, United Kingdom, April 12-13, 1967.

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2. R. W. Staehle and M. G. Fontana, Co-editors of Advances in Corrosion Science and Technology, Plenum Press.

3. R. W. Staehle, D. vanRooyen, and A. J. Forty editors, Proceedings of Ohio State Conference on Fundamental Aspects of Stress Corrosion Cracking, Sept. 11-15, 1967, by NACE.

Douglas Williams

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2. "High Temperature Sand Testing, Fifth Annual Progress Report" Trans. AFS., Vol. 53, page 175, 1945.

3. "Split Type Specimen Tube for Elevated Temperature Sand Testing" Trans. AFS., Vol. 53, page 249, 1945.

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9. "What is Foundry Sand" Mimeographed by ASME, March 1951.

10. "Industrial Engineer in the Foundry" Amer. Foundryman, page 88, May 1951.

11. "Hot Strength at Falling Temperatures--Does it Influence Hot Tear Formation" Amer. Foundryman, page 47, November, 1957.

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17. "The Bonding Mechanism in Foundry Sand Mixtures" Indian Construction News, Vol. 7, page 269, 1958. Reprinted in Liteynoye Provodstvo, page 26, February, 1960.

18. "How Much Sand--The Moisture Test Can Tell you" Current Engineering Practive, Vol. 2, page 19, 1959.

19. "Parashrinkage Phenomena--Veining, Metal Penetration Scabbing,Hot Tearing" Trans. AFS. Vol. 68, page 17, 1960.

20. "Selected Principles of Soil Mechanics Related to Sand Testing, Molds, and Cores" Trans. AFS., Vol. 68, page 107, 1960.

21. "On Stickiness of Molding and Core Sands" New in Engineering, Ohio State University, page 21, February, 1961. Reprinted in Current Engineering Practice, Vol.3 , page 38, May, 1961.

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23. "Thermal Conductivity of Rammed Sand Mixtures" Journal Steel Castings Research, No. 23, page 1, October, 1961 (with J. R. Mittendorf).

24. "Oil Bonded Cores" Lecture II, Fundamentals of Core Sands and Binders, Steel Founders Society of America, 1961.

25. "Generation of Steam Pressure in Molds" Current Engineering Practice, November, 1961.

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32. "Cohesional and Frictional Variables in Rammed Sand Mixtures" Trans. AFS., Vol. 72, page 73, 1964.

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34. "Thermal Aging Characteristics of Bottom Sands in Acid Open Hearth Furnaces" Jour. Metals, page 652, 1965.

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39. "Thermal Aging Characteristics of Bottom Sands in Acid Open Hearth Furnaces.

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45. "Penetration Phenomena" with Don R. Shirey, Research Report, 1968, American Foundryman's Society.

Outstanding Graduates

Albrecht, Albert B.	1951, Technical Consultant, Monarch Machine Tool Company
Beck, Dr. Franklin H.	M.S. 1947, Ph.D. 1949, Professor, Dept. of Metallurgical Engineering, Ohio State University
Bomberger, Howard B.	1942, M.S. 1950, Ph.D. 1952, Reactive Metals Company
Boulger, Francis W.	M.S. 1937, Battelle Memorial Institute
Bowden, Raymond K.	1920, Consultant (Retired)
Boyd, Walter K.	B. Met. E. 1945, Chief, Corrosion Division, Battelle Memorial Institute
Burns, Robert S.	B.A. 1930, B. Met. E. 1937, Director-Metallurgical Research, Armco Steel Corporation
Cunningham, George W.	Ph.D. 1960, Reactor Development Division, Atomic Energy Commission
Dierker, Arthur H.	B. Met. E. 1926, Consulting Metallurgical Engineer, A. H. Dierker and Associate (own employer)
Dugan, John M.	B. Met. E. 1967, Vice President, Blaw-Knox Company
Fick, John E.	B. Met. E. 1921, Vice President, Timken Roller Bearing Company (Retired)
Focke, Dr. Arthur E.	B. Met. E. 1925, M.S. 1926, Ph.D. 1928, Professor, University of Cincinnati
Garwood, Maurice F.	1933, Executive Engineer, Chrysler Corporation
Gegel, Harold L.	M.S. 1962, Ph.D. 1965, Air Force Materials Laboratory, Wright-Patterson AFB

Outstanding List-2

Heimberger, William W.	1916, Vice President, Buckeye International (Retired)
Henry, Don J.	B. Met. E. 1934, Head, Metallurgical Engineering Department, General Motors Research Labs
Hirth, John P.	1953, M.S. 1953, Professor, Department of Metallurgical Engineering, Ohio State University
Hoge, A. Wesley	1937, President, Houdy Process and Chemical Company
Humberstone, Joseph H.	1931, B.SC. (Honorary) 1962, Vice President, Air Reduction Company
Jackson, Glenn W.	B. Met. E. 1949, Chief Metallurgist, Duriron Company, Inc.
Johnson, Hugo E.	B. Met. E. 1940, President, American Iron Ore Association.
Koebel, Norbert K.	1935, M.S. 1936, Manager, Lindberg Hevi Duty
Lee, Harley C.	1927, Vice President, Basic Refracture, Inc.
Leslie, Dr. William C.	B. Met. E. 1947, M.S. 1948, Ph.D. 1949, U. S. Steel Research Center
Leininger, James V.	B. Met. E. 1948, Executive Vice President, Miller & Company
Luce, Walter A.	B. Ch. E. 1943, M.S. 1947, The Duriron Company, Inc.
Marshall, L. H.	B. Met. E. 1927, L. H. Marshall Company
McKinnell, Dr. Wm. P. Jr.	M.S. 1954, Ph.D. 1956, Manager, Commercial Development Division, Marathon Oil Company

Outstanding List-3

McPherson, Dr. Donald J.	B. Met. E. 1945, M.S. 1947, Ph.D. 1949, Vice President of Technology, Kaiser Aluminum and Chemical Corporation
Peters, Dr. Dale T.	Ph.D. 1962, Merica Research Laboratory, International Nickel Company, Inc.
Pickering, Dr. Howard W.	M.S. 1959, Ph.D. 1961, Bain Laboratories, U. S. Steel Corporation
Pool, Dr. Monte J.	M. S. 1959, Ph.D. 1961, Department of Materials Science and Metallurgical Engineering, University of Cincinnati
Priest, David K.	1951, M.S. 1951, Ph.D. 1953, Adviser, Faulkner, Dawkins and Sullivan
Spretnak, Joseph W.	B. Met. E. 1937, Professor, Department of Metallurgical Engineering, Ohio State University
Staehle, Roger W.	B. Met. E. 1957, M.S. 1957, Ph.D. 1965, Associate Professor of Metallurgical Engineering, Ohio State University
Stall, Richard W.	1950, Chief Quality Assurance Metallurgist, U.S. Steel Corporation
Standifer, Col. Lee R. Jr.	Ph.D. 1952, Armco Steel Corporation
Totten, Paul R.	M.S. 1948, Vice President, Chase Brass and Copper, Inc.
VanEcho, Andrew	1942, Reactor Development Division, Atomic Energy Commission
Whalen, S. J.	1951, President, Aerobraze Corporation
Zell, Robert E.	B. Met. E. 1938, General Manager, Wyman-Gordon Company

List of Graduate Degrees Granted

Qtr., Year	Master of Science	Doctor of Philosophy
Sp, 1926	Authur E. Focke	
Sp, 1928		Authur E. Focke
Sp, 1929		Charles R. Horwedel
Sp, 1932	Howard E. Russell Earl C. Kirk Reginald J. Ritter Earnest J. Tiechert	
Su, 1932	Herbert A. Grove Archie R. Stevenson	
A, 1932	James R. Blanchard	
W, 1933	Austin W. Secoy	
Sp, 1933	Clifford R. Ogden George F. Motok Paul G. Sammet Harry E. Weidenhamer Gordon R. Worthen	
Su, 1933	Lawrence E. Trishman	
W, 1934	Lawrence A. Weaver	
Sp, 1934	David H. Davis James M. Ruckman	
Su, 1935		Gerald M. Cover Lawrence E. Trishman
Sp, 1936	Albert J. Frantz Norbert K. Koebel Charles H. Lemke	
Sp, 1937	Francis W. Boulger	
Sp, 1939	John A. Nachowitz	

Qtr., Year	Master of Science	Doctor of Philosophy
Su, 1939		Dimitry Niconoff
Sp, 1940	Lloyd G. Evans	
W, 1941	Robert R. Adams	
Sp, 1941		Murray C. Udy
Su, 1943	Naaman H. Keyser	
W, 1946	Anton D. Brasunas	
W, 1947	Franklin H. Beck	
Sp, 1947	Ralph T. Eddinger Walter A. Luce	
Su, 1947	Harold Meese John W. Mueller Albert J. Pilous	Cloyd A. Snavely
A, 1947	Carl M. Carmen Harold McCollough Donald J. McPherson Joseph F. Nachman Emerson H. Wright	
W, 1948	William C. Leslie Rajeshivar D. Mathus	
Sp, 1948	Charles S. DuMont Charles E. Paetschke Authur D. Schwope Paul R. Totten	Mahusudan Mitra
Su, 1948	William G. W. Heer	Ayyappankave A. Keishnan
A, 1948		Ralph T. Eddinger John L. Zambrow
W, 1949		Franklin H. Beck

Qtr., Year	Master of Science	Doctor of Philosophy
Sp, 1949	Virgil D. Basinger Bruce Dunnington Hung-Shung Sung	
Su, 1949		William C. Leslie Harold McCollough Donald J. McPherson Emerson H. Wright
A, 1949	Eugene M. Smith	
W, 1950	Charles W. Andrews Robert N. Imhoff Ramanthan Krishnaswamy	
Sp, 1950	Irfan N. Bilen Howard B. Bomberger Mukunda B. Dutt Philip C. Pierson Paul E. Ruff	
Su, 1950	Charles A. Greenlee Clinton C. McBride John M. Stone Admiral A. Watts	William G. N. Heer
W, 1951	Narendru D. Bhalerao Chester J. Sims George W. Zuspan	
Sp, 1951	David K. Priest Richard D. Rhoney John Sedor, Jr.	
Su, 1951	Edward S. Jones Carl J. Muser Cyrus H. Philleo	Bruce W. Dunnington Ramanthan Krishnaswamy
A, 1951	Charles R. Benson	
W, 1952		Lee Roy Standifer
Sp, 1952	Shields M. Bishop	
Su, 1952	Robert D. Leggett	Monta L. Holzworth

Qtr., Year	Master of Science	Doctor of Philosophy
A, 1952		Admiral A. Watts
W, 1953		James Willging
Sp, 1953	John P. Hirth Horace R. Ogden William L. Bruckhart	C. C. McBride F. L. Orrell
Su, 1953		David Priest
A, 1953	Dwayne Day Daniel J. Maykuth Dale McKissiek	
W, 1954	Attwell M. Adair	
Sp, 1954	William P. McKinnell James Dyer, Jr.	
Su, 1954	Robert Allio	Roy Johnson
A, 1954	N. D. Green, Jr. L. R. Bidwell	
Sp, 1955	Thomas W. Schmidt Lloyd Lockwood	
A, 1955	Joseph J. Tompos	Robert M. Goldhoff
W, 1956	Gilbert A. Lenning James R. Upp	
Sp, 1956	Vincent D. Barth	
Su, 1956	Alvin M. Labroff	
A, 1956		William L. Larsen William P. McKinnell, Jr.
Sp, 1957	Roger W. Staehle	

Qtr., Year	Master of Science	Doctor of Philosophy
Su, 1957	Richard H. Rein Doraiswamy Balasundaram	Norbert D. Greene Erwin Eichen
A, 1957	Herbert Wagner Kazuteru Shimura	
W, 1958	Glenn E. Faulkner	Martin I. Jacobson
Su, 1958	George Bishop John Schroeder	Alvin J. Jacobs David L. Douglass
A, 1958	J. Carl Bovankovick Gerold A. Mancini Wilbur Moore Ralph Mangone R. Walter Steur Fred Schwartzberg	
Sp, 1959	Edward Bartlett William A. Glaeser Curtis Jackson William P. Meuli	
Su, 1959	Wilber W. Kirk Dave W. Hoffman Peter Vernia Howard Pickering David Ludwigson Monte J. Pool	Gerald M. Gordon
A, 1959	Viraf Bherucha James W. Flowers R. E. Hook John R. Gianeola Charles Leastrom	
W, 1960	Elmore M. Kennedy	
Sp, 1960		George Economy
Su, 1960	William T. Ebihara Dilip P. Rajdev Coulson Scheuermann Bob Florentino David Stahl Tony Wilhelem	

Qtrs., Year	Master of Science	Doctor of Philosophy
A, 1960	Paul J. Gripshover William Pardue Ralph Getz	George Cunningham
W, 1961		George Orton
Sp, 1961	Richard W. Douglass Hugh D. Hanes	
Su, 1961	James E. Battles Lyle L. Marsh Thomas H. Bishop Richard White Craig S. Hartley	Monte J. Pool
A, 1961	James L. McCall Robert T. Ault	Howard W. Pickering
W, 1962	Charles S. Cook James N. Cordea Martin J. Farkas Kenneth W. Foster Harold L. Gegel Gerlad Slawecki	James W. Flowers Kenneth L. Lawley
Sp, 1962	James S. Foster Robert J. Diersing	Richard K. Saxer Gerold A. Mancini
Su, 1962	Jean Bisseliches John Bucher William H. Pfeifer	Horace P. Hawkes Dale T. Peters Kazuhiro Goto
A, 1962	Maurice Amateau Japnell B. Braun William A. Gibeaut Paul L. Hendricks William Lepkowski Ying-hsin Lui	Lawrence R. Bidwell Charles C. Seastrom
W, 1963	Richard Beauchamp	
Sp, 1963	George W. King Albert M. Imgram	Gerald W. Worth

Qtr., Year	Master of Science	Doctor of Philosophy
Su, 1963	Robert A. McCoy	
A, 1963	Philippe Charpentier John T. Cammett David A. Chatfield Tatsuo Kondo Ellis D. Verink Robert E. Eppick	
W, 1964	Melvin M. Goldberg Thomas D. Cooper	Lyle L. Marsh
Sp, 1964	Edward G. Smith	Robert M. Shemenski John Bucher James R. Myers
Su, 1964	Vivekananda Kandarpa	Lee M. Adelsberg James E. Battles
A, 1964	B. Bhaskerarao Claude Robinson	James S. Foster
W, 1965	Daniel Strohecker Joseph C. Jasper Richard Reese Jerris C. Moeller	Craig S. Hartley James N. Cordea
Sp, 1965	Michael F. Dean David E. Price John E. Morral Yasuko Kondo	Doyle W. Rausch Roger W. Staehle Ellis D. Verink
Su, 1965	Gerald N. Goldberg Eric C. Bogren James A. Davis James E. Reinoehl	Tatsuo Rondo Harold Gegel
A, 1965	Thomas J. Smith Jerome J. English Carl Stuber	Fred J. Fraikor David A. Chatfield
W, 1966	Paul Kammer Marklin F. Lasker Charles A. MacMillan	Richard L. Beauchamp Rollin E. Hook

Qtr., Year	Master of Science	Doctor of Philosophy
Sp, 1966		Terry L. Davis
Su, 1966	Dale O. Condit Robert W. Cowan Ronald Cochran Sylvester Nunez Larry Gardner Glenn W. George	Ying-hsin Liu Stephen W. Gilby
A, 1966	James A. Roberson William R. Pfouts	John W. Patterson William H. Herrnstein Cyril M Pierce Curtis M. Jackson
W, 1967	Fred R. Billman James R. Lombard Robert J. Hart Charles L. Cook	William A Soffa Elmore M. Kennedy
Sp, 1967	James Eifert Jacques Sert Fred H. Haynie Warren W. Ware	
Su, 1967	Kenneth C. Johnson Lytle D. Johnson Robert E. Niebuhr John W. Young Gerald L. McEowen	
A, 1967	Edward R. Duffy R. Joseph Kasten Micheal L. Rich Richard H. Ernst Kazumitsu Shinohara Clarence W. Weidner Russell L. Wenk	Lawrence F. Bryant James E. Reinoehl
W, 1968	William D. Soccorsy Tommi Murata Robert D. Blackburn	James A. Davis Thomas E. Dunham Joseph L. Kenty Vivekananda Kandarpa Gerald H. Meier Ronald M. Latenision Ronald L. Pastorek

Qtr., Year	Master of Science	Doctor of Philosophy
Sp, 1968	Thomas R. Ferguson, Jr. Robert D. Koester	Allan H. Clauer
Su, 1968	J. Robert Chambers Salah E. Mahmoud Joseph G. Dunleavy	Melvin Goldberg David C. Stuber
A, 1968	Robert O. Slonaker Gerald L. Vaneman	Dale O. Condit James A. Macki
W, 1969	Edward J. Timmer Suresh Ghorpede	Christopher A. Friffis
Sp, 1969	John F. Wilker Daniel Shirey	Peter B. Lake
Su, 1969	John A. Young Thomas T. Hsiung Sidney Davis Michael A. Koldus	Robert L. Cowan John L. Ratliff

Number of Undergraduate Degrees (B. Met. E.)

1921 - 1969

1921	5	
1922	4	
1923	10	
1924	6	
1925	6	
1926	7	
1927	8	
1928	7	
1929	9	
1930	9	
1931	10	
1932	18	
1933	12	
1934	7	
1935	10	(1 Pro)
1936	10	
1937	5	(1 Pro)
1938	22	
1939	16	
1940	19	(2 Pros)
1941	17	
1942	11	
1943	23	
1944	11	
1945	3	
1946	1	
1947	14	
1948	14	
1949	24	
1950	17	
1951	21	
1952	9	
1953	9	
1954	9	
1955	8	(1 Pro)
1956	8	(1 Pro)
1957	16	
1958	20	
1959	13	(1 Pro)
1960	10	
1961	11	
1962	8	
1963	10	
1964	4	
1965	7	
1966	15	
1967	13	
1968	12	
1969	15	

There have been a total of 541 B.Met. E. degrees granted by the Department of Metallurgical Engineering in the period 1921-1969. This figure does not include 6 Professional degrees (Metallurgical Engineer) which were granted to individuals who had held a Bachelors degree for at least five years and had made a significant contribution in the field of Metallurgy. In other words, these were degrees awarded for professional achievement as opposed to academic achievement.

Mining Engineering

1956 - 1966

Mining Engineering, which had been separated from the Department of Metallurgical Engineering since 1913, was reinstated as the Division of Mining Engineering under the department in 1956. The Department of Mining and Petroleum Engineering had been having its problems for years due to general apathy of the mining and petroleum industries to promote interest in and support for the curriculum, and thus enrollment in the program was very low. In 1956, Vice President Carson revealed that the Department of Mining and Petroleum Engineering was to be abolished with Mining to be assigned divisional status under Metallurgical Engineering and Petroleum under Chemical Engineering.

The Mining curriculum, which had been headed by Professor J. Richard Lucas in 1956, was taken over in 1957 by Robert J. Frantz who had been an instructor under Lucas who had resigned. During the following years the undergraduate student level in Mining was very low (18-20 students) and the Division maintained only two staff members, Assistant Professor Frantz and Charles A. Beasley, Instructor. The Division was averaging 3-4 undergraduate degrees per year. In 1962 William J. Verner was appointed Instructor and Assistant Professor Frantz elevated to Associate Professor.

The Mining Division remained under Metallurgy Engineering until February, 1966. During this time 34 students were granted Bachelors degrees. By 1966, very few students (8-10) were entering the Professional Division in Mining. The lack of industrial interest and support, and shifting techniques in mining (open-pit mining) industry lead to a re-evaluation of the cirriculum. The College of Engineering decided to move the Mining Engineering curriculum to the Department of Civil Engineering due to the increasing number of mining companies hiring civil engineers and also the applicability of civil engineering to many of the present mining problems.